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Operationalizing Embeddedness for Sustainability in Local and Regional Food Systems

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Agricultural systems are deeply embedded in social processes and the institutions that govern them. Measuring these processes and understanding the extent of that embeddedness is critical to crafting policy for sustainable agricultural systems. The bulk of measurement in sustainability research, however, focuses on economic and environmental indicators such as farm profitability and water quality. Since policy is most often aimed at what is measured, it tends to focus on issues like price, production, and market access. And while those are important, policies aimed at social issues such as community reciprocity are often outside the scope of policy design.

The gap between social measurement and policy is not for lack of care; the importance of social dynamics is well known. Yet due to the difficulty of measuring complex social systems—*How does one measure values?*—more straightforward economic and environmental measures dominate research and policy. When social systems *are* measured, as, for example, with the social capital or sustainable livelihoods frameworks, they often do so using economic methodologies and indicators. Such economic-based social indicators are important but focus heavily on outcomes such as poverty or profitability. Accordingly, the complex social processes that lead to such outcomes such as culture, heritage, tradition or generational dynamics are often overlooked.

These policy and methodological difficulties present a problem: measurements import the theoretical framing of their intellectual development. Economic methodologies are largely rooted in an atomistic theory of human behavior in which individuals are selfishly motivated by economic gains. While individuals do seek economic success, they are also motivated by social connection, reciprocity, values, and culture. The institutions governing these social processes and the degree to which individuals and businesses are embedded in society are incredibly important, yet poorly understood and measured.

This paper outlines a theoretical framing for understanding these complex social processes and develops a methodology for measuring social embeddedness in local and regional agricultural systems. Coined by sociologist Karl Polanyi, embeddedness is the extent to which economic systems like markets are governed by non-economic systems such as culture and social cohesion. While markets and their price and output components are well understood and widely measured, the non-economic institutions like culture and values that support and govern markets have tended to be seen as non-measurable. This has important policy implications for rural agriculture.

Accordingly, this paper develops a tool for measuring the social embeddedness of producers and consumers in ten agricultural sectors in Vermont that can be replicated across New England. The tool uses a Likert scale survey designed to understand the degree to which producers and consumers are motivated by self-interest—what we call Instrumentalism—and the extent to which they are market-oriented—what we call Marketness. Survey responses are analyzed using a Factor Analysis to generate Instrumentalism and Marketness scores for each survey respondent on a scale of -1 to 1. The Embeddedness Type Matrix consists of a vertical Instrumentalism axis and a horizontal Marketness axis that together create four quadrants that represent different types of embeddedness: embedded, underembedded, disembedded, and overembedded. Individual consumers and producers are plotted on the matrix based upon their respective Instrumentalism and Marketness scores and yield an embeddedness type given their quadrant. Plotting all producers and consumers of a particular industry on the Embeddedness Type Matrix provides an understanding of the motivations, values, actions, and interactions of the individuals in that industry.

This paper provides researchers and policy makers in Vermont and New England with a tool to understand and measure the social aspect of agricultural sustainability in multiple industries. This approach allows for the design of policy aimed at aspects of the food system outside of price, production, and market access alone.

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Executive Summary

The importance of people, their institutions, and the relationships between and among them and the environment have been explicitly recognized for decades. In its conceptualization of sustainable development, the Brundtland Commission's report for the United Nations (1987) identified social sustainability as one of three core pillars. Nevertheless, social sustainability has received little attention, especially compared to economic and environmental sustainability (Kandachar 2014). As a team of social scientists, we have dedicated this project to recommending a method that captures the embedded nature of social relationships, networks, and processes that underlie agricultural sustainability efforts. This summary highlight key points in the white paper and guides the reader to specific sections of interest.

Scholars and practitioners have encountered substantial difficulty in operationalizing social sustainability (Boström et al. 2015) due in part to the complexity of the content—how to measure values, social cohesion, equity, and empowerment or, importantly, how they all interact? Nevertheless, there have been several attempts to capture the social dimensions of sustainability including the popular sustainable livelihoods framework and social capital, the most widely used framework to assess social sustainability in agrifood systems (Section 2.1.3). Owing to the difficulty of social measurement, social sustainability measurements have tended to draw upon existing economic frameworks (Section 2.1.3). As we reviewed the various approaches to understanding social sustainability, we consistently identified common issues, both theoretical and methodological in nature, that distort how people make decisions in reality. These issues have important policy implications: when measurements are inaccurate, the effectiveness of policy is limited.

While we detail our critiques in the following white paper (Section 2.1), we highlight here why we find existing approaches to capturing social sustainability insufficient.

- First, the theory upon which economic measurements are rooted views humans as selfish and asocial (Section 2.1.1). While we do not dispute that individuals make decisions in their best interest, we are confident that individuals also make decisions based on other motivations (Section 2.1.2, 2.1.4). Relationships with friends and family, commitment to community, cultural connection, and connection to the environment are all important factors in how and why we make decisions. The peril of assuming that people are singularly motivated by self-interest, has been widely documented and often leads to non-sustainable outcomes including exacerbated social inequality (Tobin, Glenna, and Devaux 2016), impeded gender equity (Gengenbach et al. 2018), and environmental degradation (Mellor 1997).
- Second, and related, the most widely used measurements in social sustainability consistently categorize the world into a series of capitals (financial, social, human, cultural, built) to be leveraged for gain (Section 2.1.3). This approach assumes that people uniformly operate by leveraging their existing resources, not for their inherent value, but to achieve desirable outcomes. Respect, altruism, generosity, love, care, and reciprocity are not motivations that can be reduced to a series of resources that people seek to leverage.
- Third, while measuring outcomes is important, failing to understand or measure the processes that lead to those outcomes risks missing the social dynamics inherent in agricultural processes (Section 2.1.4). The formation of social relations within agricultural communities and the forging of relationships among family members, friends, and farmers in food production are processes that require further study. Social capital is an outcome of

these processes, just as poverty, food security, and profitability are. Policy that addresses these outcomes must be based in an understanding of the processes that generate them.

Efforts to incorporate social dimensions into sustainability studies, measure outcomes like income equality and food security, and include conceptualizations of resources beyond financial capital are welcome additions to the economic indicators that dominated research and policy throughout the 20th century. Yet, neither outcomes nor resources provide adequate insight into the social processes that lead to sustainability (Section 2.1.2, 2.2.5, 3.3.2). Important as they are, these measures are silent on *why* people make the decisions they do. The reasons for a farmers choice of one production method over another, to engage in one market arrangement instead of another, or to donate extra food to pantries cannot be explained by profitability or finances alone.

The basic premise of this white paper is that measurements inherently import assumptions about the way the world works. If a tool is based in an economic framework of maximization, it will fail to explain factors outside of economic maximization and reinforce the assumptions of that model (Section 1.1). When our measurements are partial, our understanding of systems is weak; and when our understanding is weak, our policy proposals will be limited in their effectiveness. Sustainable agricultural processes require relationships, trust, and connection to the environment, and measurement and policy must capture those processes.

Further, understanding the social processes behind why decisions are made is important because a policy's effectiveness is largely determined by how well it matches the motivations of the people for whom its benefits are intended (Long 2001). Policies that seek to activate self-interest in a set of individuals with more complex goals than maximizing their gain are likely less effective than those that incorporate a more nuanced approach. This could help explain why, despite more than 15 years of policy effort in the dairy industry, the number of farms has decreased each of the past 20 years. Similarly, sustainable agricultural policies based on established approaches such as the social capital framework assume that farmers and consumers make decisions to maximize profit and consumption and fail to adequately address the importance of culture, community, or the land in sustainability decisions (Section 2.1.3, 2.1.4).

This white paper offers a measurement tool based in embeddedness, a social theoretical framework that argues that complex social dynamics are a critical piece of economic activity (Section 2.2.1, 2.2.2, 2.2.3). Originally articulated by Karl Polanyi (1971), embeddedness is the degree to which economic institutions are governed by non-economic institutions (Section 2.2.1, 2.2.2, 2.2.3). In other words, the formal (e.g., law and markets) and informal (e.g., moral values and cultural connections) institutions that people create, maintain, and contest across time and space inform how economies operate. This means that rational choice and social capital frameworks fall short of explaining how social life functions because institutional contexts, and thus people's behavior, are diverse. Embeddedness has been applied to describe important social dynamics that form the basis of sustainable connections among agricultural producers, processors, consumers and their environments (G. G. Bell 2005; Hinrichs 2000; A.B. Trubek 2008).

Our work has synthesized the embeddedness literature to develop a measurement tool (Section 3.0) that can generate metrics of social sustainability (Section 3.2.1) and characterize the social context of food system actors and their values and motivations. The methodology we propose measures critical aspects of social life such as goals, trust, and cohesion (Section 3.2.2) to measure embeddedness (Section 3.2.5) amongst producers and consumers in the food system. While the examples and discussion in this paper focus on Vermont, the methodology is applicable

and adaptable to other states in New England as well as states and regions across the country and world.

The tool uses the factor analysis statistical method to analyze survey responses and assign individuals a score for instrumentalism (i.e., the degree to which people are self-interested) and marketness (e.g. the degree to which people are market-oriented) (Section 3.1). Those scores are then plotted along instrumentalism and marketness axes on the Embeddedness Type Matrix (Section 3.1.1) to generate an embeddedness type for individual producers and consumers among the following categories: embedded, underembedded, disembedded, and overembedded (Section 3.1.2). An example matrix can be seen in *Figure 1* below and includes example scores for producers and consumers and the resulting placement on the matrix.

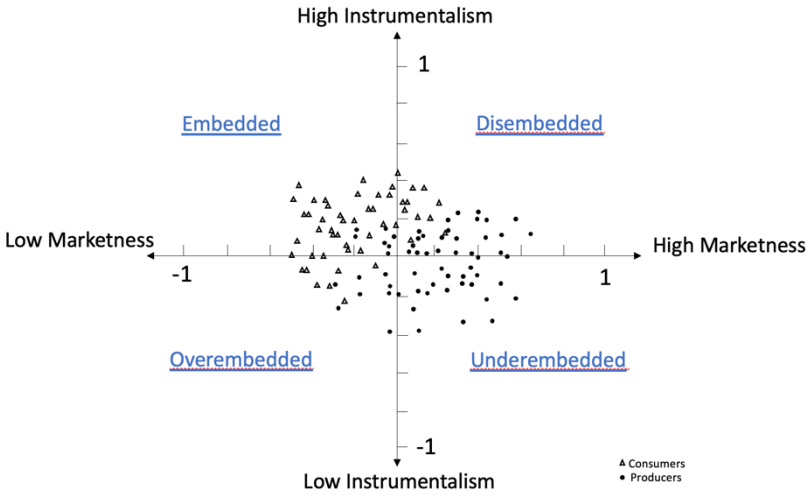

Figure 1:Example Embeddedness Type Matrix

The embeddedness measurement tool in Figure 1 offers a new method for studying sustainability in Vermont and New England food systems. Because social sustainability in general and embeddedness in particular have received insufficient empirical attention, relevant data are scant and crude, both in terms of what they measure and at what scale. We argue that capturing social sustainability in any meaningful way will demand committed and consistent effort to collect new datasets. Our aim in creating this tool has been to facilitate that pursuit.

This tool is also well-positioned to synergize with the recommendations of other white papers that have been produced by the UVM-ARS. Intriguing and important questions that connect social sustainability to other forms of sustainability become possible with the measures that we propose. For example, the type of embeddedness that exists in a given place appears to be tightly coupled with environmental sustainability (Jones and Tobin 2018). Likewise, we hypothesize that the type of embeddedness that exists has significant implications for economic policy. Dairy products, for example, that add value through sustainable production processes such as organic or grass-fed likely require different policies than those that encourage efficiency and scale (Section 3.3.3). The tool allows for analysis that examines how farmer and customer embeddedness types interact with how, why, and for what ends resources are accessed and used in a given place, thereby offering critical insight into the equitable or inequitable distribution of these resources.

These are just a few examples of the illuminating effect that measuring embeddedness can provide to the charge of the UVM-ARS Center to promote the sustainability of diversified food systems and small farms. We are excited to present this tool for measuring embeddedness in the white paper that follows.

1.0 Introduction

1.1 The Problem

In the United States, traditional business metrics dominate food and agricultural policy, both as goals and measures of success. The thrust of agricultural policy is focused on prices, profit, access to markets, and production. Of the farm portion of the 2018 Farm Bill, i.e. the non-nutrition assistance portion, 68% focuses on commodity price protections or insurance for price fluctuations ("2018 Farm Bill by the Numbers" 2018). The commodity price support portion of the Farm Bill increased 45% between the 2014 and 2018 bills. While these policies are in the context of other goals such as rural development and conservation, the means for attaining those goals nevertheless centers on accounting metrics and not on rural development or conservation metrics per se.

In Vermont the policy focus is similar. This is evident in most sectors, but is especially prominent in the dairy sector, which has dominated Vermont's agriculture for almost a century. In 2006, Governor Jim Douglas said of Vermont dairy: "It's part of our culture, our way of life." In launching the Vermont Milk Commission, Douglas said that farmers are "the stewards of the land, and they maintain the working landscape that's so important to our natural beauty and our tourism." Yet, in 2017, Act 77's discussion of the Milk Commission was to ensure "equitable dairy pricing." In 2019, the Agency of Agriculture Growth Management plan under Secretary Anson Tebbets who said the work of the Milk Commission was "to get [farmers] to a place where they can get a better price for their products."

Additionally, while the *Vermont Agriculture and Food System Plan 2020* focuses on the cultural impact of, and quality of life created by Vermont's food system, its main focus is nevertheless on price, profit, branding an image, and access to markets. The plan's initial recommendations for apple, cheese, dairy, and maple focus largely on pricing, branding, niche market penetration, and access to external markets. While other factors are certainly considered, traditional business metrics are indeed the focus.

Price and economic return are critical pieces of a sustainable food system and are essential to a healthy farming industry. But price and profit are not the only important variables in sustainable agricultural systems. While Vermont has embraced non-industrial food and farming systems, the goals and measures of success nevertheless tend to mimic industrial systems' focus on price and profit. Designing policy to address these accessible indicators risks missing key issues in agricultural economies.

The theoretical backdrop of the national and state-wide focus on price is an economic model, known as the rational actor model, in which individuals are perfectly rational and asocial, and make decisions based solely on maximizing individual utility, or well-being. This theory forms the basis of the neoclassical economic thought that has dominated policy in the Unites States and the globe since WWII. Price, in this model, exists as a measurable proxy for the otherwise unmeasurable utility. The rational actor model of economic activity lies behind the bulk of agricultural policy today, with its focus on price and supply supports, and demand creation. The theoretical underpinnings of such policies envision producers and consumers in an asocial economy who simply seek to maximize profit and consumption.

Theory Context[1*]
Since motivations and values are hard to measure and cannot be compared between individuals, price acts as a universal proxy for how and why individuals express their wants and needs. Price thus dominates policy as a tool applicable to all people and all situations.

Producers and consumers, however, are deeply connected to one another, hold values that are outside the

[*] [1] This paper includes text boxes that provide summaries and policy implications of theoretical points in the text.

scope of individual utility maximization, and make decisions with a host of factors other than profit in mind. Price and profit are important decision factors, to be sure, but farmers and consumers act in ways that are always social and often selfless, displaying heterogenous behaviors and making decisions according to values and culture. Policies that are aimed at price, profits, and market penetration, while important, are rooted in the theoretical rational actor model and therefore fail to address the values, motivations, and cultural and social components of real-world decision making. Accordingly, problems persist in agricultural outcomes partly due to this misalignment between policy and the theory that informs it, and the reasons farmers and consumers produce and buy goods. For example, despite decades of policy effort aimed at combatting hunger and greater wealth than any time in human history, food insecurity is relatively unchanged (USDA 2019).

Price and traditional business metrics persist despite this misalignment due to the relative ease of collecting such metrics. Measuring values and motivations and quantifying the complex social dynamics inherent in farm and food systems is difficult and the metrics do not currently exist. Because of this, economic indicators tend to provide the thrust for food policy in Vermont, New England, and across the US.

This is especially true in the dairy industry where, as it has struggled in recent decades, policy solutions center around price supports and subsidies while failing to craft policies aimed at, or informed by an understanding of, the deep social connection of dairy farmers and their communities, and the vital role that dairy plays in the Vermont socio-environmental landscape. Understanding the non-price dynamics of the dairy industry will allow Vermont to craft policy that includes, alongside price, factors that are currently not studied or policy focuses.

Policy Context
Dairy farming is critical to the Vermont culture and social landscape. Policy must accordingly be broader than price and production supports and focus on community, culture, and social connection

1.2 The Embeddedness Approach

We argue in this paper that better food system outcomes require a new theoretical model that will inform a different, more comprehensive food system policy framework. In order to develop a sustainable agricultural system in Vermont, it is necessary to understand and measure factors outside of price and profit to include the values and motivations of producers and consumers.

The concept of embeddedness provides a theoretical framework for engaging with agricultural policy in a way that captures the complex social and culture dynamics that shape economic activity. Embeddedness conceives of all economic activity as deeply embedded in social context including rules, norms, beliefs, community, and institutions. Markets are not asocial exchange mechanisms but are deeply embedded in society. The economy, as opposed to an institution outside of society, is inextricably enmeshed within social institutions. Economic decisions are limited in their individualism by the social embeddedness of economic actors and market exchange is, by definition, social. While the rational actor of asocial markets maximizes utility and profit, embedded economic actors make decisions based upon a set of values and are motivated by considerations including but not limited to maximization.

Theory Context
Measuring profitability is straightforward, so policy tends to address issues like price and production. But profitability, fails to capture social, cultural, and familial relations that are critical agriculture including the effect of divorce on farms. Policy, then, reflects an obscured reality.

The problem is that, while understanding embeddedness is critical, policy is most often enacted on what is measured. Without tools to measure embeddedness, what is measured are outcomes such as profit, production, and price that

are easily quantified. Policy thus includes price and production supports and market access, while missing the embeddedness that is essential to agriculture.

To increase policy efficacy, the rational actor theoretical framing should be replaced with a social embeddedness framing that allows for economic measurement that integrates values, social context, and behavior alongside price and profit considerations. This will provide context for why individuals make the decisions they make when those decisions do not accord with the rational actor model. This paper develops a methodology for measuring embeddedness that will allow policy makers to more closely align sustainable food systems policies with the motivations of farmers and consumers to generate sustainable outcomes. While we focus on Vermont, the methodology developed in this paper provides an opportunity for Vermont and UVM to lead the way in understanding and practicing more sustainable forms of agriculture across geographies.

2.0 Problem: Background

2.1 Outcomes and Processes in Sustainable Agriculture

2.1.1 The Rational Actor

Current measures of local sustainable agriculture largely rest upon a flawed model of human society and individual motivations, and therefore, policy prescriptions that address those measurements are equally flawed. This chasm between policy, measurements, and reality has critical implications for sustainability outcomes.

The rational actor model of neoclassical economics dictates that producers and consumers are atomistic actors who make decisions based solely on selfish utility, or wellbeing, maximization. Society is simply a collection of "homogenous globules of desire" (Veblen 1898) without values who operate in an anonymous market. In fact, Nobel laureate Gary Becker argued that social dynamics are so inconsequential in economic action and analysis that individuals in his models produced children without mating (Becker and Tomes 1979, 1161).

These assumptions about how people and markets operate, however inaccurate, were made in order to measure otherwise immeasurable systems (Ament 2019). Additionally, since wellbeing is impossible to objectively measure and cannot be compared between individuals, neoclassical economists used price as a proxy for wellbeing (Farley et al. 2015) by assuming that individuals would perfectly express their desires through buying and selling on the market.

The utility-revealing price mechanism became the hegemonic centerpiece of the supply and demand model that dominates agricultural policy today, including crop insurance and commodity subsidies. In this model, price allows producers to maximize profit and consumers to maximize consumption given budget constraints. Price, therefore, in economic models and the policies they inform, is assumed to stand in for all other motivations and values and is the central organizing principle of economic activity. This has critical implications for how we measure outcomes and design policy for sustainable agriculture.

2.1.2 The Social Side of Production

Markets reveal value through the price mechanism by commodifying labor and resource productivity. Labor and resources are treated as economic inputs (Mellor 2006) and are remunerated according to their marginal productivity. Markets accordingly separate productive processes from the re-productive processes that make productivity possible (Biesecker and Hofmeister 2010) such as relationships with friends and family, emotional care, and biological and metabolic processes like eating and sleeping. This process

Theory Context
Farming requires farmers' physical labor, but farmers' physical labor requires sleep, food, digestion, sex, and relationships of care. While the latter are not for sale on the market, they are no less important to farm production.

leads to the externalization of the re-productive and social processes as those processes are categorized in the realm on non-value and unremunerated since they are not for sale on the market, i.e. one cannot buy rest or metabolism.

Viewing production as critically dependent upon reproduction informs the notion that agricultural sustainability is an *outcome* of an underlying *process*. Those processes involve more than what is for sale in a market. Sustainable agricultural practices, therefore, must recognize all processes that makes production possible as valuable, including both productive and re-productive, and consider the social context within which production operates (Perkins 2007). That those processes—and not simply the outcomes they generate—must be measured is the central argument of this paper.

2.1.3 Social Measures that Imply a Rational Actor Framework

Much of the literature and organizational reports that measure and advocate policy related to the social dimensions of sustainable agriculture, at both the international and local levels, considers social topics such as food security and nutrition, sustainable food systems, sustainable livelihoods, and social capital. The measurements employed in this literature include poverty and income, mobility, caloric intake, and access to assets.

While these social categories and metrics are indeed cognizant of social dynamics, they nevertheless rest upon a low-level rational actor model in which individuals are calculative agents who weigh their individual interests against collective interests (Bridger and Luloff 2001). Importantly, many of these social indicators treat 'social' as a static outcome, a thing that can be measured, as opposed to a process underlying many of the social outcomes in question.

The food security and nutrition framework is focused on food access and nutritional outcomes of individuals. Examples of reports couched in this framework include FAO's "The State of Food Security, Nutrition in the World" and The Rockefeller Foundation's "Reset the Table". Collectively, reports such as these inform food policy aimed at alleviating hunger, are heavily focused on price, market penetration, and farmer profitability and reflect the political economy of society.

Theory Context
Affordability for consumers and market access for producers is critical. But so is understanding the cultural importance of certain farm practices, the social importance of intergenerational farming, and how food products are traditionally exchanged.

According to The World Bank, "knowing what crops are selling where and for how much is essential information…and critical for developing food policies for entire nations" because "in order to end extreme poverty, we need to be able to benchmark it" (The World Bank 2017). The United Nations' FAO writes similarly about "increasing affordability of a healthy diet" and designing policy so that the "cost of nutritious food comes down" (FAO 2020a).

While these data are important for designing policies to eliminate hunger, the focus on price and market access implicitly incorporates the rational actor model that assumes that price reflects values and motivations in the absence of social processes. Food insecurity and hunger, however, are outcomes of social processes. The reliance on measuring discrete outcomes based in market transactions means social processes are ignored. Data must, therefore, reflect underlying social processes so that food policy can incorporate social complexity.

Policy Context
Land and equipment can be prohibitively expensive for farmers. Banking deregulation and interest rates play an important role in making farming financially difficult (CIDSE 2020).

The sustainable livelihoods framework offers measures of resilience. Livelihoods, in this context, is defined as "the means of gaining a living" (Chambers 1995). Doing so sustainably includes utilizing capabilities and

assets in a way that can cope with shocks while not "undermining the natural resource base" (Scoones 1998). Similar discussions of self-sufficiency center around metrics including economic performance, access to non-aid finance, institutional performance, aid dependence, and vulnerability (Reynolds et al. 2017).

These approaches tend to miss the broad social contexts that influence the ability of individuals to gain a living (Scoones 2009). Similar to the rational actor model of asociality, the sustainable livelihood framework tends to overlook the influence of power and politics in livelihood outcomes (Scoones 2009; Serrat 2017). Again, a sustainable livelihood is treated as an outcome, but the processes leading to that outcome lack attention.

The sustainable livelihoods approach focuses on using five capital assets—human, social, natural, physical, and financial—to achieve livelihood outcomes. Accordingly, the framework approaches the world as a series of resources to be leveraged for individual, rational gain. Even social capital, which considers things like trust, shared values, and networks of connections (Serrat 2017) is conceptualized as an input to be leveraged for increased production.

Social capital is a widely used framework that conceives of networks of social relations that bind people as a community. These relations are as "essential for…the production of…goods…[as] other forms of capital" (Farr 2004). The social capital framework aims to use social dynamics to improve productive efficiency (Robert D. Putnam 1993, 167; Hyun-soo Kim 2016, 233) much like financial or physical capital might (Putnam 2001, 21).

Theory Context
Social processes such as community and family relationships are deeper and involve more than their ability to generate returns on financial or built capital.

Social capital finds its roots in the works of neoclassical economists Alfred Marshal and John Hicks who used the term to distinguish between different types of capital stocks (Woolcock 1998). In a modern formulation of social capital, Coleman (1988) sought to embed the rational actor into social conditions. Importantly, social capital frameworks focus on how investments in social networks deliver market access or resource mobilization (Lin 2002).

The social capital framework is more about how relationships allow economic actors to gain access to resources than about the relationships themselves (Acquaah, Amoako-Gyampaah, and Nyathi 2014). In action, rather than drawing upon a network analysis, social capital draws upon an accounting framework in the employment of returns (Xin and Qin 2011). It is, again, outcomes based: one increases productive capacity by investing in a social network.

Further, social capital has become one of the "trendiest terms" in the development literature (Farr 2004). The way it tends to be used conflates social outcomes and the productive capacity that social capital can generate with the embedded processes upon which those outcomes rely (Gretzinger et al. 2018, 24; Hyun-soo Kim 2016; Tregear and Cooper 2016). As Portes and Sensenbrenner write, "social capital is the result of embeddedness" (1993). Czernek-Marszałek writes similarly, arguing that interpersonal relationships that generate group-level benefits stem from an actor's social embeddedness (2020).

Policy Context
Policy aimed at social aspects of the food system should include an understanding of culture, values, and motivations, not simply access to resources and increasing productive capacity.

While the above analyses are broad and international, in Vermont, it is evident that social topics are not considered in a manner that addresses processes. The Vermont Agriculture and Food System Plan: 2020 argues that "when a company has developed social capital, it is much easier to access other resources such as investors, recruiting experts, or building a team

(Willard et al. 2020). This again treats social dynamics as a resource to be leveraged and fails to consider how such a resource is acquired.

2.1.4 The Failures of Social Outcome Measurements

Sustainable agriculture must be thought of as both processes and outcomes. As processes lead to outcomes (Himes and Muraca 2018), simply addressing outcomes such as social capital, poverty, livelihoods, or food access—the focus of mainstream social frameworks—conflates the processes that lead to outcomes with the outcomes themselves. For example, it is important to understand how and why a multi-generational farm uses family and community labor, and not simply the profit margins it achieves from doing so.

This is not to say that outcomes like profitability are not important or should not be measured. But using those measures as proxies for underlying processes fails to address social dynamics and thus defaults to familiar policy solutions such as price, market access, production increases, and capital infusions. Considering labor practices again, understanding the role of family and volunteer labor in the social fabric of a community may inform alternative policy solutions such as labor subsidies, basic income for farm workers, or tuition deferment for student farmers.

Measuring the social dynamics of agricultural systems, not as a productive input, but as a dynamic process, is critical. We must measure and understand shared norms, not simply the outcomes of shared norms. The following section explores how.

At the same time that farmers make decisions based upon price, production, and profit, they also make decisions outside of those confines because, for many, the goal of farming and the values that inform farming decisions are not solely profit based (M. Bell 2004) While the price and production approach to assessing agricultural systems is limited to the activity observable in markets and reflected in traditional economic measurements, significant economically-invisible agricultural processes exist that are critical to successful sustainable agricultural initiatives (Müller and Sukhdev 2018). Similarly, agricultural processes are not contained solely within the agricultural policy and practice but are embedded within a larger system that includes other industries as well as the economic, cultural, and environmental processes of society. The following section explores those processes.

Policy Context
Policy that aims to address farm profitability will look much different than policy that aims to address the cultural dynamics behind why farmers become farmers, stay farmers, and make decisions on their farms.

2.2 Embeddedness

2.2.1 What is Embeddedness?

Sociologist Karl Polanyi pioneered the idea of embeddedness by arguing that "the human economy…is embedded and enmeshed in institutions, economic and non-economic" (Polanyi 1957, 250). In stark contrast to the rational actor model in which atomized actors make selfish decisions to maximize utility, embeddedness is often thought of as the degree to which economic activity is constrained by non-economic factors (Chen and Scott 2014) such as friendship, aesthetics, affection, loyalty and reciprocity (Kloppenburg, Hendrickson, and Stevenson 1996, 37). Economic activity, in this view, exists within an extensive web of social relations, institutions, and norms in which the individual actor is embedded. Importantly, embeddedness differentiates economic outcomes, such as material need satisfaction, from the social and environmental processes that create those outcomes (Jones and Tobin 2018, 70).

Polanyi described how human society transformed from economies of reciprocity and redistribution to market society. In those former systems, economic activity was organized through deeply embedded traditions of gift exchange, debt payment and cancellation, and trust (Mauss

1990; Graeber 2014; Dodd 1994). In market economies all production and distribution is organized through the price mechanism of the market. This transition is historically novel: "instead of economy being embedded in social relations, social relations are embedded in the economic system" (Polanyi 2001, 60).

Since, in a market economy, all production and distribution occurs within the market, all production must be produced for sale on the market. This implies that all income is derived from the market. Since all production requires land and labor, and all distribution requires money, the key distinction of a market economy is that the price mechanism must exist, not only for the commodities that are sold, but for land, labor, and money as well; their prices being, rent, wage, and interest, respectively (ibid, 72). Polanyi called these 'fictitious commodities' because, while they are critical to the functioning of markets, their production does not take place on market, and they are not produced for sale. Land is nature; labor is human activity; and money is a social relation (Ingham 1996; Ament 2020). Commodification disembeds these 'commodities' from their social, biophysical, and environmental contexts and aligns them unnaturally with the mechanism of the market. [2] The restructuring of land from a cultural and productive resource into speculative commodity is largely responsible (Barnett 2000) for the 1980s Midwest farm crisis and the social dislocation, unemployment, and health issues that followed (Meyer and Lobao 2003).

2.2.2 Values and Social Context

While market economies are distinct from reciprocal and redistributive economies, markets are nevertheless infused with norms and values and are deeply embedded in the social context within which they operate, even if that context is individualistic. The values of economic actors can be divided into instrumental and relational values (Jax et al. 2013) and drive the economic processes that occur within society (Jones and Tobin 2018). Instrumental values concern individual needs and desires (Arias-Arévalo, Martín-López, and Gómez-Baggethun 2017), while relational values concern relationships with individuals and the environment. These values are a function of the benefits that actors seek: while instrumental values concern individual benefits, relational values concern generating benefits for multiple parties (Jones and Tobin 2018, 69). For example, community supported agriculture programs may embody relational values and seek benefits for farmers, community members, and the environment, while a publicly traded food processing facility may embody primarily instrumental values and seek monetary benefits for shareholders.

Theory Context
When a rural farmer is forced to cut labor costs during an economic downturn or a consumer purchases a more expensive option due to its having been grown locally, they are negotiating their values against a broader market economy.

Individual values exist on a spectrum from instrumental to relational and are spatio-temporally malleable. Economic decisions involve a negotiation between these individual values and the social context within which decisions are made. In the context of a market society, individuals justify market exchanges in relation to the social and environmental values they hold (Galt et al. 2016, 348; Kloppenburg, Hendrickson, and Stevenson 1996).

These negotiations constitute not just individual, but society-level negotiations as well, and frame how this paper

Policy Context
Policy tools such as land and labor subsidies, and land and capital trusts can decommodify farming inputs and give farmers more options in the market.

[2] It is the commodification of land, labor, and money that allows all production and distribution to be organized through the market and what distinguishes a market economy from an economy with markets.

proposes to measure embeddedness. Values are not individually subjective, nor are social structures objective in a positivistic sense (Berger and Luckmann 1967). Rather, individual values—and the benefits that individual actors seek—and social structures interact constantly to form the macro social context within which economic decisions are made (Krul and Ho 2017, 844). An individual farmer cannot operate a farm that is outside of the commodity food system while borrowing money for land and paying labor according to its productivity. It is this context that determines which values individuals can express in economic activity.

2.2.3 Instrumentalism and Marketness

Just as the market economy does not follow the dictums of self-interested economic actors operating in an anonymous market, "embeddedness does not entail the complete absence of market sensibilities" (Hinrichs 2000, 297). Rather, individual economic transactions take place according to degrees of marketness and instrumentalism (Block 1990).

Instrumentalism concerns the nature of individual motivation in an economic action and ranges from altruistic to egoistic (de Groot and Steg 2007; Steg et al. 2011). Economic actors with high levels of instrumentalism prioritize individual economic goals while those with low levels prioritize concerns for friendship, family, community, or morality (Hinrichs 2000, 297). Marketness concerns the extent to which price is the dominant consideration in how individual motivations are expressed. High levels of marketness indicate that price considerations dominate economic decision making, while at low levels of marketness, non-price considerations such as trust, identity, and social connection take on greater importance (Block 1990, 51).

Instrumentalism and marketness are spectrums that together help to explain the negotiation between and among instrumental and relational values and the macro social context discussed above. The concepts also illuminate how economic behavior can be simultaneously price conscious and community-minded (Mariola 2012, 578) as the expression of individual values such as care for environmental resilience is constrained by a social context in which markets dominate exchange. Accordingly, embeddedness on the one hand, and instrumentalism and marketness on the other are not diametrically opposed but rather, coexist in degree to form the complex social texture within which economic decisions are made.

2.2.4 Embeddedness: Negotiating Market and Non-Market Motivations

Embeddedness exists at the relational scale in which economic agents interact with one another, but also at the structural scale in which individuals negotiate actions according to the context within which they exist (Granovetter 1985). It is this interplay between relations and structure, and motivations and values that highlights that embeddedness is not distinct from markets and prices and does not imply qualities like good or bad. Farmers are embedded in their communities while selling into markets and fetching a price for their goods. Embeddedness does not imply a friendly antithesis to markets, and prices are not the iniquitous alternative to a virtuous embeddedness. Even amidst strong communal ties, prices and self-interest are apparent.

Theory Context
Embeddedness is not necessarily good and prices are not all bad. Vermont farmers exist in a broader market economy and must negotiate their motivations for farming—social, environmental, economic—against an economy that requires financial success.

Embeddedness, then, concerns the context in which actions take place, the values that drive those actions, and the manner in which the two affect and are affected by one another. In the embedded market, it is the expression of coexisting instrumental and relational values that drive the degree of instrumentalism or marketness that plays out in economic activity at the relational and structural scales. Price and individual goals are important in the context of

embeddedness, but their full expression is limited by relational values (Migliore, Schifani, et al. 2014, 551). Similarly, relational values are limited in their full expression by price and individuals goals and the structural context within which those values are held (McKee 2018).

This give and take is important when considering sustainable agricultural systems in a market society where profit and prices are essential components of decision-making. Mortgages must be paid, wages must be earned, capital must be borrowed, and prices must be competitive. Farmers who are deeply embedded in their social communities must nevertheless earn a profit to continue their operation. And consumers whose values are communal still make decisions based on price. Prices and profit are embedded in market systems and are part of the complex social fabric in which decisions are made. This negotiation, the continuous jostling of values and contexts, is tremendously important when developing indicators of sustainable agriculture.

2.2.5 Embeddedness is Critical to Sustainability

While the above sections have discussed how social connection, trust, and community are essential to economic life in general, understanding those values and systems is critical to alternatives such as sustainable agriculture (Sage 2003; Payán-Sánchez et al. 2018).

Sustainable agricultural processes require relationships, trust, and connection to the environment (Payán-Sánchez et al. 2018; Brinkley 2017, 315) and the individualist motivations of the rational actor model are negatively correlated with social and environmental concerns (Steg et al. 2011; Raymond and Kenter 2016). Communities with stable populations and strong community relationships have been shown to be more conducive to transitions to sustainable agriculture (Lorendahl 1996; Ring, Peredo, and Chrisman 2010; Tregear and Cooper 2016; Huggins 2000; Phyne, Hovgaard, and Hansen 2006; Laschewski, Phillipson, and Gorton 2002).

Theory Context
Consumers at farmer markets tend to be motivated by factors like organic, local, and labor standards and are willing to pay a premium for "sustainable" food (Chen and Scott 2014). Producers who are deeply connected to their community tend to produce according to principles of sustainability (Sage 2003).

For agriculture to be sustainable, producers and consumers must be motivated by community and environmental values and act in ways that reflect those values. This includes everything from farming and labor practices to market access and sales techniques. Accordingly, embeddedness is an important piece of sustainable food systems. This does not mean that embedded food systems are sustainable. But if sustainability is a goal for a food system, they must actively recognize agricultural production as deeply embedded in social, cultural, and environmental processes.

In achieving sustainable outcomes, it is necessary to value inputs from the perspective of their embeddedness in these processes rather than their contribution to commodity production (Jochimsen and Knobloch 1997a). This means, for example, viewing soil as part of a complex ecosystem that supports food production rather than a medium in which to grow food. Such a view requires stewardship and decision making based on relational values and motivations outside of price *despite* the context and instrumentality of the broader system.

Policy has an important role in ensuring that sustainable processes lead to sustainable outcomes due to its ability to actively recognize embeddedness and align the organizational principles of the system with the values and motivations of those within the system. This includes increasing equitable access to land, regulating non-sustainable production, and supporting sustainable labor and farming practices. Measuring those values and motivations, and the dynamics inherent in values and actions is thus critical to sustainability. We turn to that now.

3.0 Solution: Developing a Tool for Measuring Embeddedness

The rational actor model upon which much agricultural policy—price, profit, market access—is rooted fails to consider the social nature of producers and consumers in markets. Those frameworks that do include social considerations often imply a low-level rational actor framework and fail to consider complex social dynamics of agricultural processes—including values and motivations—and thus measure outcomes in much the same way economic models do.

It is necessary to measure the embeddedness of individuals in order to incorporate the embedded nature of social processes into sustainable agricultural policy. Yet, due to the complexity of embeddedness—including negotiated values and motivations between individuals and society across space time and context—no tools for measuring embeddedness currently exist. This section develops a tool for measuring embeddedness that includes an embeddedness matrix and marketness and instrumentalism scores, and a strategy to use that tool to inform policy.

3.1 The Embeddedness Type Matrix

3.1.1 Developing an Embeddedness Type Matrix

The Embeddedness Type Matrix (ETM) is designed to assess how farmers, consumers, and agricultural industries in general are embedded. As discussed, embeddedness is not a quality, but, rather, a characteristic. Embeddedness is neither positive nor negative and does not exist on a continuum of more or less embedded. Importantly, embeddedness is not a characteristic that exists in opposition to markets; markets are deeply embedded in social context. Distant commodity grain markets and local farmers markets are both embedded, though in different ways. We thus argue that it is more appropriate to consider embeddedness, not in degree, but in type. This is consistent with (Velvin, Bjørnstad, and Krogh 2016; Sage 2003; Pinna 2017; Kitsos, Carrascal-Incera, and Ortega-Argilés 2019; 2019).

Our framework for embeddedness draws upon Block's (1990), Hinrichs' (2000), and Galt's (2013) discussions of instrumentalism and marketness—specifically that neither instrumentalism nor marketness exist in opposition to embeddedness. Instead, we conceptualize embeddedness as framed by degrees of instrumentalism and marketness. Block (1990) argued that economic activity exits in degree along a spectrum of marketness. We add that economic activity also exists in degree along the spectrum of instrumentalism. Thus, we place instrumentalism and marketness along two axes in a matrix to develop the four embeddedness quadrants in *Figure 2*.

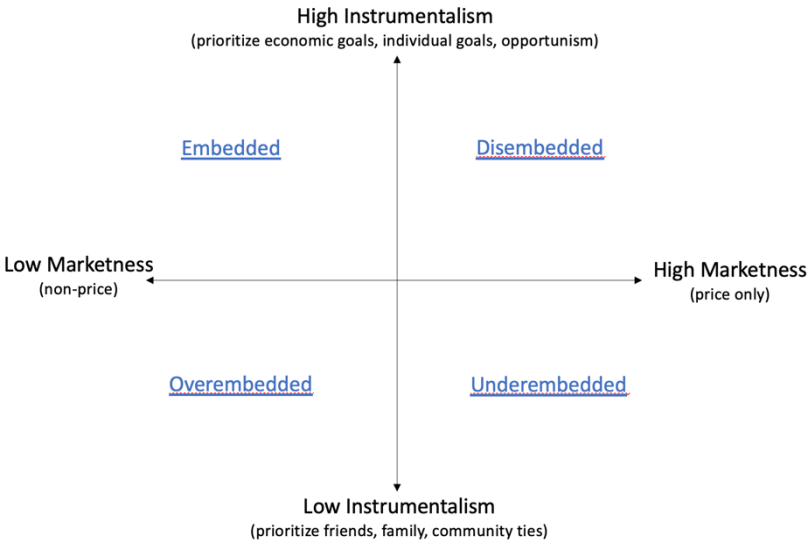

Figure 2: Embeddedness Type Matrix

We draw upon Akgün et. al.'s (2010) approach to categorizing embeddedness that incorporates local embeddedness (Kalantaridis and Bika 2006), social embeddedness (Uzzi 1996; Block 1990), ecological embeddedness (Whiteman and Cooper 2000; Penker 2006), and spatial embeddedness (Sonnino 2007; Sonnino and Marsden 2006) to create a typology with four types of embeddedness: embedded, disembedded, underembedded, and overembedded.

These embeddedness types do not imply quality as processes are always and everywhere embedded. Rather, they represent the extent to which values and behaviors are oriented toward and engage with embeddedness. For example, the values and behaviors of individuals in the disembedded quadrant, while embedded in a specific social context, are oriented away from and disengaged with that embeddedness. An industrial farm that sells corn on the global commodity markets is embedded in the community in which it operates but may perceive itself outside of, and therefore disengage from, that community. It is this denial that disembeds such a producer.

The Embeddedness Type Matrix places each embeddedness type within an instrumentalism/marketness quadrant. *Figure 2* shows how embeddedness in this matrix is not a degree in itself, but, rather, a function of the degree of instrumentalism and marketness. Since all market interactions are embedded, the ETM provides a framework for considering values and motivations of economic actors, and understanding how, not if, they are embedded.

3.1.2 Understanding the Embeddedness Type Matrix

The ETM determines embeddedness as a function of how an individual's degree of instrumentalism or marketness interact. For example, an embedded producer is motivated by individual economic goals but expresses those goals in a non-price manner. This section explores ETM to understand how this paper proposes to measure embeddedness.

The Instrumentalism axis identifies the values that drive individual motivation. Actors with high levels of instrumentalism prioritize economic goals based on instrumental values with benefits intended for themselves (Jones and Tobin 2018). Individuals with low levels of instrumentalism prioritize family and community ties based on relational values whose benefits are intended for multiple parties (ibid). While high levels of instrumentalism undermine social ties, low levels strengthen those ties (Hinrichs 2000, 297).

The Marketness axis identifies the relevance of price in expressing values. Individuals with high levels of marketness prioritize price and profit when making decisions. Individuals with low levels of marketness prioritize quality, community, and environment when making decisions. At low levels of marketness where price is a less important driver of action, values are expressed in a more complex web of social relations (Block 1990, 53).

In the high marketness/high instrumentalism **Disembedded** quadrant, price is the primary motivator and individual goals drive actions. In this quadrant producers are profit maximizers and consumers are utility maximizers. This is not to say that these actors are unembedded, but rather, hold values and express those values in a way that is individual-based, for example large scale dairy operations or industrial maple production funded by non-local venture capital.

In the **Underembedded** quadrant, individuals display high marketness and low instrumentalism. Accordingly, price is the primary motivating factor, but values are community-based. Individuals in this quadrant are conscious maximizers. Examples might include industrial organic, rural marketing, or models of sustainable (or green) capitalism.

The **Overembedded** quadrant includes individuals for whom price is not a primary motivator and the values that drive actions are communal. While actors in this quadrant are limited in their success by their social closure (Akgün et al. 2010) and can have difficulty responding to shocks (Kitsos, Carrascal-Incera, and Ortega-Argilés 2019), they may have access to alternative forms of labor and markets due to their social ties. Nevertheless, some degree of instrumentalism or marketness is critical to success in a market economy (Bloom and Hinrichs 2011).

Finally, in the low marketness/high instrumentalism **Embedded** quadrant, price is not a primary motivator and individual goals are driven by individual values. Embedded producers may be described as "profit sufficers" (Sage 2003) who pursue economic success by way of factors other than price, while embedded consumers prioritize individual health or taste in alignment with

their values. The prioritization of economic goals in this quadrant may include the use of non-local markets to sell a product using local inputs and labor (Akgün et al. 2010, 541; Sage 2003, 53).

Figure 3 gives examples of producers in each of the embeddedness quadrants of the ETM.

As this section has explained, embeddedness type results from a complex dynamic of interaction between values, motivation, and action. Embeddedness is not static and can change in space and time, and according to context and product. Similarly, the axes between embeddedness quadrants should be thought of as opaque and fluid boundaries across which individuals may cross rather than strict demarcations of type. It is also critical to remember that no quadrant is good or bad and should not be interpreted as degrees; they are simply types of embeddedness.

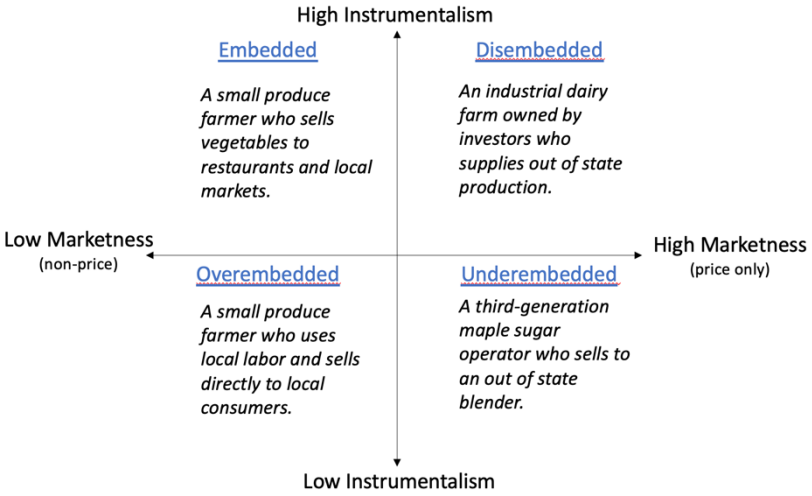

Figure 3: Examples of Embeddedness Type Producers

3.2 The Embeddedness Scores

3.2.1 Developing Embeddedness Scores

To measure embeddedness, this tool utilizes a survey of small and medium-sized farms and their customers. The survey uses a unipolar Likert-scale survey to measure marketness and instrumentalism and place farmers and consumers in one of the four quadrants on the ETM.

Measuring embeddedness, instrumentalism, or marketness directly is difficult due to the complex and abstract nature of the terms. Accordingly, the tool utilizes a factor analysis that uses observed, Likert-scale questions, to measure latent or underlying factors, such as instrumentalism and marketness. While a factor such as instrumentalism cannot be easily measured directly, as a latent factor, it causes behaviors that can be measured through survey responses. Factor analysis measures the relationships between observable items in order to provide a measure of an unobservable factor. (Details in *Methods and Methodology* below.)

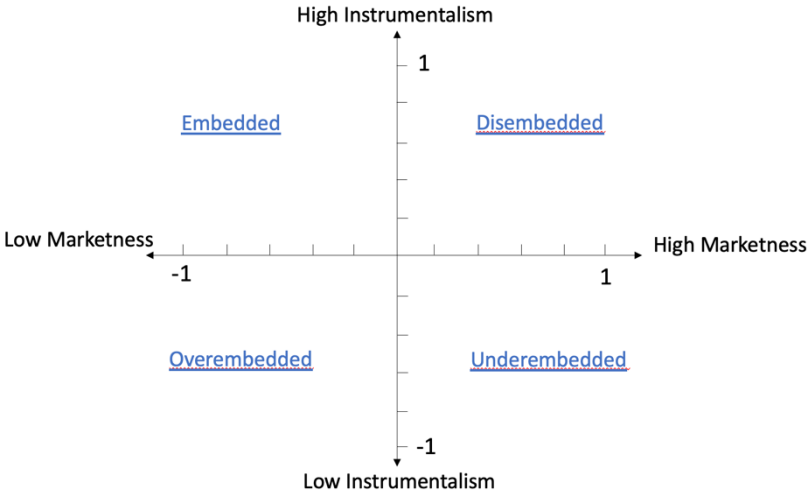

Figure 4: Embeddedness Score Grid

The survey provides producers and consumers with a score of -1 to 1 for both instrumentalism and marketness. Taking both scores together assigns individuals to one of the quadrants in *Figure 4*. (Details in *Other Measurements* below.)

3.2.2 Factors to Measure

A literature review of embeddedness and sustainable agriculture informed the factors and topics that in the survey. This set of literature, both theoretical and empirical, identified characteristics and attributes that are critical to understand and investigate when measuring embeddedness. *Appendix A* details these characteristics, organized by instrumentalism and marketness, and includes citations for reference.

The tool measures five broad topics for the Instrumentalism axis. These topics are listed in bold below. Survey questions were designed using these criteria.

- **Shared commitment:** information transfer, risk, trust, uncertainty
- **Goals:** concerns of the environment, economic goals, health, local food system
- **Inputs and Outputs:** local inputs as percent of production, length of supply chain, core and repeat customers, output sold locally, length of distribution chain
- **Social Connection:** bond between farmer and consumer, community connection, industry importance, networks of relations, redistribution
- **Values:** community importance, instrumental and relational values in action, land stewardship, non-production food values, salary concerns

The tool measures four broad topics for the Marketness axis. These topics are listed in bold below. Survey questions were designed using these criteria.

- **Costs:** by-products as inputs to production, operating costs, transportation costs
- **Decision drivers:** profits, prices
- **Fictitious commodities:** cost of land, access to money and credit, labor usage
- **Market dynamics:** demand, perceived competition

3.2.3 Unit of Analysis

The survey is designed to measure the instrumentalism and marketness attributes of producers and consumers in the Vermont agricultural system. The survey is also intended to be administered to producers and consumers in ten industries in Vermont, chosen from the *Vermont Agriculture and Food System Plan: 2020*. The industries include apples, dairy, grass-fed beef, hemp, maple, produce, cheese, processed and lightly processed vegetables, food-grade grains, and goats. These industries could be adapted to the context of other states or regions that utilize the ETM.

The tool uses a factor analysis (more in *Methodology and Method*) on the survey responses to generate an instrumentalism and marketness score for each individual producer and consumer that, when placed on the ETM, results in a scatterplot of producers and consumers for each industry above. Producers and consumers are represented by different colors to differentiate embeddedness trends between the two economic groups. (Details in *Reading the Matrix* below.)

3.2.4 Survey Development

Using the table in *Appendix A* as a guide, we generated an initial pool of 241 potential survey questions from existing theoretical and empirical research in embeddedness in agricultural systems that elucidate producer and consumer values, motivations, and behavior. The initial pool of questions was comprised of affirmative statements (Lahne, Wolfson, and Trubek 2017) of the form "I feel a sense of obligation to my consumers." All questions are in the form of a unipolar 1-5 Likert scale with response options from "Strongly Disagree" (1) to "Strongly Agree" (5). Items that are theorized to be negatively correlated with embeddedness are analyzed in reverse (details in *Methodology and Method*). The full pool of initial survey questions are found in *Appendix B*.

The authors reviewed the pool of questions, eliminating, clarifying, and adding questions in order to develop a 74-question survey for producers and a 38-question survey for consumers. These surveys can be found in *Appendix C*. Following best practices from Chen (2013) and Chen and Scott (2014), we propose to have the revised question pool reviewed by subject area experts to further develop the surveys. We propose to administer the revised surveys to a development sample of producers and consumers across industries and, using confirmatory factor analysis, determine question-factor correlation. The final surveys for producers and consumers will be tailored for each industry by changing wording but keeping question content the same.

3.2.5 Methodology and Method

The embeddedness tool uses a factor analysis on survey responses to measure two factors, instrumentalism and marketness, from survey questions. Factor analysis is a "best practice" in the methodological literature for reducing the number of observed variables to a smaller set of latent or underlying factors (DeVellis 2011; Lahne, Wolfson, and Trubek 2017). While latent variables, such as instrumentalism and marketness, cannot be directly measured, they can be indirectly measured by examining the relationships they cause in observed variables.

We chose factor analysis over principal component analysis due to our perception of the causality of factors on observed variables. While principal component analysis assumes that observed variables influence latent variables, factor analysis assumes that latent variables influence observed variables and are, thus, revealed by observed variables. Our approach to embeddedness is that individual values and the social structure within which those values operate influence the expression of those values in the form of actions and survey responses.

Confirmatory factor analysis (CFA) is used when a theoretical structure, such as the one developed in *Appendix A*, informs the variables in a factor model (Ferguson and Hansson 2015a). The tool utilizes CFA to analyze the embeddedness survey responses to 'confirm' that observed variables are correlated with the factor theorized above (de Groot and Steg 2007). A CFA with oblique rotation and a target of two factors assigns a factor load of 0-1 for each variable that explains the variable's correlation with each factor (Migliore, Caracciolo, et al. 2014). Factor loadings are compared to the theoretical structure to confirm that the variables with the highest loadings are assigned to the appropriate theoretical factor, and variables are realigned to factors with which they have the highest loading, if necessary (Lahne, Wolfson, and Trubek 2017).

Factor loading can be used to determine a factor score in multiple ways (DiStefano, Zhu, and Mîndrilã 2009). This tool uses a weighted load-weight sum factor score in which observed variable values are multiplied by their weighted factor loading to assign a score of 1-5 for each factor. These scores are normalized from -1 to 1 to assign a factor score for each individual for each factor, instrumentalism and marketness. Individuals are then placed on the ETM to determine embeddedness type for each individual. For details on developing a confirmatory factor analysis, see *Appendix D*.

3.2.6 Other Measurements and Considerations

In addition to 75 Likert-scale questions, the survey includes open-ended questions to gain qualitative insights into motivations of agricultural actors in Vermont. Qualitative data are important in providing insight into the expressed values and motivations of economic actors in a way that a numerical score is unable, and in demonstrating the social nature of empirical social science research. Open-ended responses are also included to update the survey and the theoretical framing behind the survey questions for later iterations of this study.

The survey is designed to be implemented longitudinally to understand how producer and consumer motivations and actions and their placement on the ETM, as well as the embeddedness

of particular industries, change through time, especially in response to seasonality and exogenous shocks. This allows for statistical studies that test hypotheses about embeddedness and outcomes such as profitability, social metrics, community health, and food security.

3.3 Operationalizing the Embeddedness Tool

This section explores how to read the ETM, identify where sustainability fits on the matrix, and understand how policy can affect producer and consumer placement within the context of sustainability.

3.3.1 Reading the Matrix

We offer a hypothetical example to demonstrate how to read the ETM. Consider a dairy farmer whose 74 survey responses, after being scored using the method outlined above, yield an instrumentalism score of .37 and a marketness score of -.02. This farmer, denoted by a star, would be deemed embedded. Continuing this example with 50 dairy consumers and 50 dairy producers, produces the example dairy ETM in *Figure 5*.

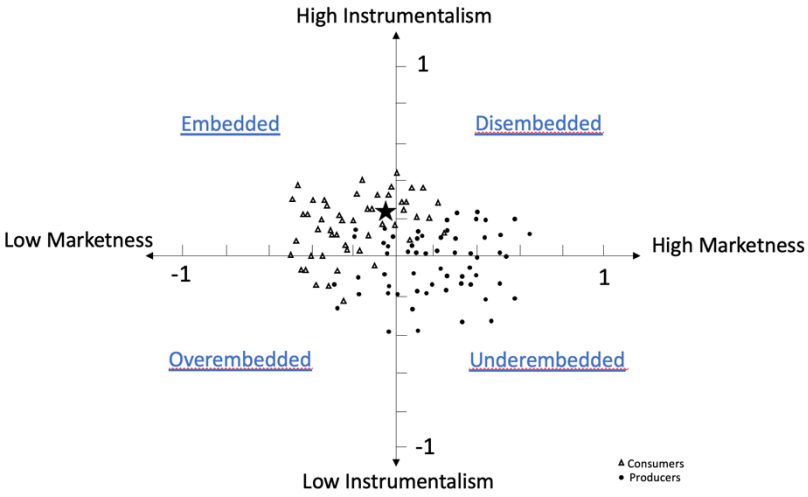

Figure 5: Example Embeddedness Tool Results

As this example figure shows, dairy consumers in Vermont, with individuals represented by green points, fall more frequently in the embedded and disembedded quadrants than dairy producers, represented by blue points, who fall more frequently in the overembedded and underembedded quadrants. Consumers display higher levels of instrumentalism, in general, while making decisions across the marketness spectrum. Producers display lower levels of instrumentalism while making decisions more heavily weighted toward price considerations. This differentiation between consumers and producers may indicate that, as a whole, producers are not able to meet the values of an embedded consumer base. From a policy perspective this may mean increasing opportunities for small farmers including subsidized land and labor costs, and access to local markets.

3.3.2 Sustainability

Agricultural systems are sustainable if they provide food in such a way that the economic, social and environmental bases to provide food in the future is not compromised (Nguyen 2018). Accordingly, a sustainable food system must be profitable, socially beneficial, and environmentally just (Hinrichs 2000, 295). Due to the interaction of these three critical components, we outline the region of sustainable agriculture as the green-shaded area in *Figure 6*.

As *Figure 6* shows, and as this paper has argued, embeddedness is not synonymous with sustainability and low levels of marketness and instrumentalism do not guarantee sustainability.

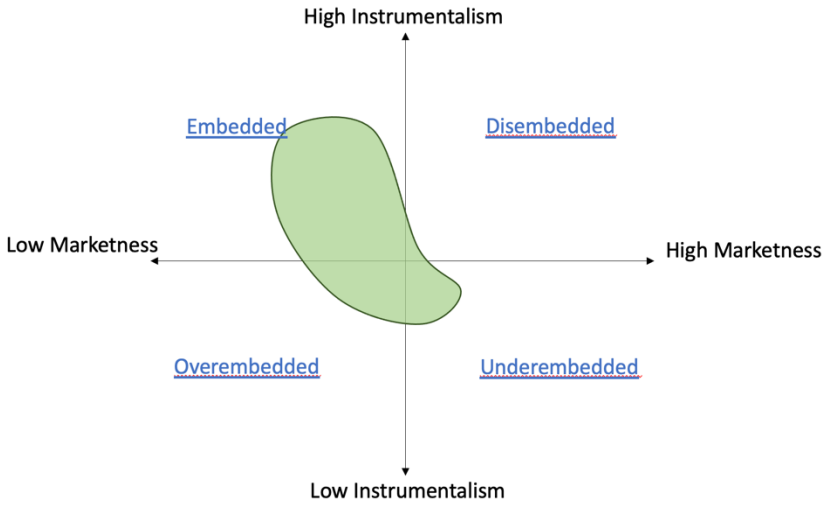

Figure 6: EMT Sustainability Region

Indeed, sustainability rests upon relational values with society and the environment, and expresses those values by means other than price. At the same time, however, some degree of instrumentalism is critical to the economic success of small and medium farms. Similarly, some focus on price is required to be profitable in the long term. While too much instrumentalism and too much marketness certainly undermines the social bonds and environmental relationships that are precursors to sustainable food systems, too little focus on price and economic success can undermine a viable farm. It is this dynamic between social and environmental values, on the one hand, and economic success, on the other, that exemplifies embeddedness in a market economy and informs the region of sustainable agriculture on the ETM.

Sustainable agricultural practices can be tested using regressions where the dependent variable is sustainability outcomes and the independent variable is embeddedness type. Similarly, hypotheses regarding the relationship between embeddedness and sustainability can also be tested using the embeddedness score. The ETM can also be used with predictive modeling to predict the impact of policy changes, to be explored now.

3.3.3 Policy Implications

The Embeddedness Type Matrix, with its visible demonstration of the sustainability region, will assist policy makers in designing and implementing policy to 'nudge' actors in the direction of sustainability by means other than the traditional price and production goals. This includes labor policy, land access, and subsidization of socially embedded industries.

Analyzing the data underlying embeddedness scores, including factor loads and individual question responses, reveals the dynamics where policy can have the most impact in embeddedness and sustainability. For example, if a large portion of producers were to exhibit high levels of marketness and the factor loads and survey responses concerning mortgages revealed that the cost of land was considerable factor in being placed outside of the sustainability region, policy could be directed at interest rates on farmland mortgages or subsidized or free farm land. This could have the effect of reducing the importance of mortgage decisions in farm operations and, in effect, 'move' farmers to lower levels of marketness.

From the perspective of consumers, if it is revealed that the price of food limits individuals' ability to express their social and environmental values, policy could be designed that could have the effect of limiting the level of marketness in consumer behavior. It may seem counter-intuitive to use price policy to address the failings of price, but in a market economy, price is the central organizing factor. Sustainability policy should be about making price less important in decisions so that other values can be expressed.

Overall, the Embeddedness Type Matrix allows policy makers in Vermont, New England, or wherever the ETM is utilized to view the social landscape of agricultural industries, understand what drives embeddedness type, and consider policy that will move individuals and industries into the sustainability region.
Latent variables show that increase in underlying variables may mean increase in embeddedness.

4.0 Conclusion

This paper fills what we believe to be a methodological and theoretical gap in understanding and measuring the social aspects of sustainability. By drawing upon the social embeddedness literature, this paper develops a theoretical framework for understanding the complex social interactions that take place in small- and medium-sized farms. This is in contrast to the rational actor model upon which much economic analysis, and therefore policy prescriptions, are implicitly based. This approach allows policy makers to design polices that are well-aligned with the issues facing farmers and those who consumer their food.

That this paper develops a methodology for measuring embeddedness does not imply that price, production, and market access measurements and policies are not important. Nor does it imply that outcomes measurements such as poverty, food access, or food security are not useful. Those measurements and indicators and the policies they inform are critical to sustainable agricultural systems. This paper is meant to complement that work in order to provide a broader understanding of agriculture, specifically the complex social dynamics that support agricultural production and consumption.

The policy implications of a broader understanding of the social dynamics of agricultural landscapes are exciting. By understanding how farmers make decisions and what motivates their actions, policy can be aimed at things like sustainable land conservation, just labor practices, and culturally-appropriate distribution systems. For example, if the cost of farmland, including mortgages and leasing, proves to be a driving factor in farmer decision-making processes, perhaps limiting their ability to undertake the sustainable practices they would otherwise like to, policy could be designed to subsidize land or mortgage rates, or keep land in agricultural trusts. Likewise, if it is learned that community relationships are an important component of waste management practices, supply chain cooperatives could be set up to allocate byproducts from one farm to be used as inputs at another.

These are just a few examples of how measuring social embeddedness has the ability to provide the understanding that has been heretofore missing but is critically important for designing policy based upon what actually motivates farmers and consumers in Vermont and New England. We are confident this white paper will be a critical component of the work the UVM-ARS will undertake in the future.

Appendices

Appendix A: Instrumentalism/Marketness Table
Literature and Data Sources that Support ETM Categories and Survey Questions

1. **I**nstrumentalism
    a. Shared **C**ommitment
        i. **I**nformation transfer (Czernek-Marszałek 2020, 2)
            1. Positive knowledge externality (Kitsos, Carrascal-Incera, and Ortega-Argilés 2019, 2)
            2. Communication (Kitsos, Carrascal-Incera, and Ortega-Argilés 2019, 5)
            3. Knowledge exchange (Tregear and Cooper 2016, 102) (Kitsos, Carrascal-Incera, and Ortega-Argilés 2019, 5) (Hoopes and Postrel 1999)
            4. Problem solving (Czernek-Marszałek 2020, 2)
        ii. **R**isk
            1. Risk sharing between farmers and community (Galt et al. 2016, 502, 506)
            2. Upfront commitment of members (Galt et al. 2016, 507)
            3. Risk reduction ((Kitsos, Carrascal-Incera, and Ortega-Argilés 2019, 4; Czernek-Marszałek 2020, 2)
        iii. **T**rust (Hinrichs 2000, 296) (Sage 2003, 47) (Granovetter 1985, 490)
            1. Trust minimizes risk and uncertainty (Mariola 2012, 579)
            2. Advice is listened to (Ferguson and Hansson 2015b)
            3. Reputation for flexibility, solidarity, information exchange (Granovetter 1985, 490) (Czernek-Marszałek 2020, 2)
            4. Opportunism (Granovetter 1985, 487; Akgün et al. 2010, 541) (Czernek-Marszałek 2020, 2) (Mariola 2012, 579)
            5. Commitment fulfilment (Czernek-Marszałek 2020, 2)
            6. Access to new resources (Czernek-Marszałek 2020, 3)
        iv. **U**ncertainty
            1. Flexibility in dealing with uncertainty (Czernek-Marszałek 2020, 3)
            2. Farmer stress (Galt et al. 2016, 502)
            3. Support felt by farmers from community (Galt et al. 2016, 506)
    b. **G**oals
        i. **C**oncerns of the Environment (Steg et al. 2011; de Groot and Steg 2007; Raymond and Kenter 2016)
        ii. **E**conomic Goals (Hinrichs 2000; Galt 2013)
        iii. **H**ealth (Galt et al. 2016; Krul and Ho 2017)
        iv. **L**ocal Food System (Chen 2013; Krul and Ho 2017)
    c. **I**nputs and Outputs
        i. **I**nputs
            1. Local inputs use as percent of production (Akgün et al. 2010) (Kitsos, Carrascal-Incera, and Ortega-Argilés 2019, 5)
            2. Local inputs used due to relationships (Velvin, Bjørnstad, and Krogh 2016, 265)
            3. Local by-products used as an input (Kitsos, Carrascal-Incera, and Ortega-Argilés 2019, 5)

4. Long term relationships and repeat use of contractors and vendors (Granovetter 1985, 498, 496)
5. Length of supply chain (Sage 2003, 55)
6. Shared equipment (Tregear and Cooper 2016, 103)

ii. **O**utputs
1. Core Customers and Repeat Customers (Galt et al. 2016, 507)
2. Output sold locally/non-locally (Kitsos, Carrascal-Incera, and Ortega-Argilés 2019)
3. Quality, locality, naturalness of the food (Sage 2003, 55)
4. Output diversity (Sage 2003, 55)
5. Length of distribution chain in steps and miles (Bazzani and Canavari 2013)
6. Direct to consumer, branded, bulk blended, central distributor, and processor.
7. Touchpoints between production and consumption (Sage 2003, 51)

iii. **R**eciprocity (Hinrichs 2000, 296) (Sage 2003, 47)

d. **S**ocial Connection (Hinrichs 2000, 296) (Sage 2003, 47)
i. **B**ond between farmer and consumer (Galt et al. 2016, 495, 506) (Migliore, Caracciolo, et al. 2014)
1. First name basis (Hinrichs 2000, 295)

ii. **C**ommunity volunteerism/events/connection (Velvin, Bjørnstad, and Krogh 2016, 266)
iii. **I**ndustry
1. Industry importance in Social/Environmental landscape.

iv. **N**etworks of relations
1. Between managers of farms (Granovetter 1985, 495)
2. Between farms (Galt et al. 2016, 507)
a. Disputes settled out of courts? (Granovetter 1985, 496)
b. Trade organizations (Granovetter 1985, 495)
3. Between workers on different farms
4. Amongst workers on the same farm
5. Farm network size (Gretzinger et al. 2018, 25)
6. Within farm network size (Ferguson and Hansson 2015b)

v. **R**edistribution

e. **V**alues
i. **C**ommunity Importance
ii. **I**nstrumental and Relational Values in action as decision making criteria (Koponen 2002, abstract; Jones and Tobin 2018; Migliore, Caracciolo, et al. 2014, 107)
iii. **L**and stewardship and relationship to nature
iv. **N**on-production values (Sage 2003, 50)
1. Preparation accomplishment (Amy B. Trubek et al. 2017; Lahne, Wolfson, and Trubek 2017)
2. Regard: mutual regard of personal relationships between producers, consumers, and others that compromise an alternative food network (Sage 2003, 58)
3. Pleasure in consumption and digestion

v. **S**alary versus Living in the community, working with the land, providing a benefit to community? (Galt 2013, 342).

2. **M**arketness
    a. **C**osts
        i. **B**y-products as intermediate inputs because of cost (Kitsos, Carrascal-Incera, and Ortega-Argilés 2019, 5)
        ii. **O**perating Costs (Galt 2013)
        iii. **T**ransportations costs (Kitsos, Carrascal-Incera, and Ortega-Argilés 2019, 5)
    b. **D**ecision Drivers
        i. Pro**f**its
            1. Break even (Galt 2013, 342)
        ii. **P**rices
            1. Price of CSA (Galt et al. 2016, 495)
            2. Prices as driver of decisions of sales and purchases (Galt et al. 2016, 495)
    c. **F**ictitious Commodities (Granovetter 1985, 505; Galt et al. 2016, 495)
        i. **L**and:
            1. Mortgage payment/assets
            2. Mortgage payment/revenue
        ii. **M**oney:
            1. Interest payments/revenue
            2. Debt payments (Galt 2013, 342)
        iii. **X**Labor:
            1. Farm income/living wage (Galt 2013)
            2. Farm labor wage/living wage (Curry and Koczberski 2012)
            3. Salary of owner (Galt 2013, 342; Galt et al. 2016, 501)
            4. Wage of labor, farmers, managers. (Galt et al. 2016, 501)
            5.
    d. **M**arket Dynamics (Galt et al. 2016, 495)
        i. **D**emand is Lacking
        ii. **P**erceived competition of other CSAs

Appendix B: Initial Survey Question Pool

*Code is determined by the bolded letters in Appendix A for the theoretical category that each question represents.

Initial Question	Theoretical Category	Code*	Retained
I have increased competency as a result of my network.	*Instrumentalism, Shared Commitment, Information Transfer*	ICI1	
Information and resources in my network have helped me in my farm.	*Instrumentalism, Shared Commitment, Information Transfer*	ICI2	
I can access knowledge from my network that is a benefit to my farm.	*Instrumentalism, Shared Commitment, Information Transfer*	ICI3	Y
It is important to share solutions with other farmers to resolve problems.	*Instrumentalism, Shared Commitment, Information Transfer*	ICI4	
I learn techniques from other farmers.	*Instrumentalism, Shared Commitment, Information Transfer*	ICI5	
I reimburse pre-payments when crops fail.	*Instrumentalism, Shared Commitment, Risk*	ICR1	
I share production risk with my customers.	*Instrumentalism, Shared Commitment, Risk*	ICR2	Y
Customers pay in advance for products.	*Instrumentalism, Shared Commitment, Risk*	ICR3	
I pay my farmer in advance for my food.	*Instrumentalism, Shared Commitment, Risk*	ICR4	
My work is risky.	*Instrumentalism, Shared Commitment, Risk*	ICR5	Y
I trust other farmers in my network.	*Instrumentalism, Shared Commitment, Trust*	ICT1	Y
I trust the consumers of my products.	*Instrumentalism, Shared Commitment, Trust*	ICT2	
It is important to consult advisors before making decisions.	*Instrumentalism, Shared Commitment, Trust*	ICT3	
When new information is learned it is shared.	*Instrumentalism, Shared Commitment, Trust*	ICT4	
I have a reputation for being flexible to customers needs.	*Instrumentalism, Shared Commitment, Trust*	ICT5	Y
I am in solidarity with my consumers.	*Instrumentalism, Shared Commitment, Trust*	ICT6	
I fulfill my commitments to farmers and customers.	*Instrumentalism, Shared Commitment, Trust*	ICT7	
I am satisfied with my stress level/quality of life.	*Instrumentalism, Shared Commitment, Uncertainty*	ICU1	

My customers form a supportive community around my farm.	*Instrumentalism, Shared Commitment, Uncertainty*	ICU2	Y
My consumers are loyal.	*Instrumentalism, Shared Commitment, Uncertainty*	ICU3	
I am stressed as a result of my work.	*Instrumentalism, Shared Commitment, Uncertainty*	ICU4	
I face uncertainty as a farmer.	*Instrumentalism, Shared Commitment, Uncertainty*	ICU5	
I feel supported by my community.	*Instrumentalism, Shared Commitment, Uncertainty*	ICU6	
The commitment of my community helps reduce uncertainty and risk in my farm.	*Instrumentalism, Shared Commitment, Uncertainty*	ICU7	Y
I do not fear tough times due to the commitment of my community.	*Instrumentalism, Shared Commitment, Uncertainty*	ICU8	
The main benefit of my products is that they are environmentally friendly.	*Instrumentalism, Goals, Concerns of the Environment*	IGC1	Y
I am concerned about the air conditions around my farm.	*Instrumentalism, Goals, Concerns of the Environment*	IGC2	
I am concerned about the soil conditions around my farm.	*Instrumentalism, Goals, Concerns of the Environment*	IGC3	
I am concerned about the water conditions around my farm.	*Instrumentalism, Goals, Concerns of the Environment*	IGC4	
I am satisfied with my ability to maintain/improve soil quality. (concerned?)	*Instrumentalism, Goals, Concerns of the Environment*	IGC5	Y
I purchase the food I do because lower carbon footprint.	*Instrumentalism, Goals, Concerns of the Environment*	IGC6	Y
I purchase the food I do because of the positive impacts of on the environment.	*Instrumentalism, Goals, Concerns of the Environment*	IGC7	Y
I purchase the food I do because of the reduction in agro-chemicals.	*Instrumentalism, Goals, Concerns of the Environment*	IGC8	
It is important to reduce chemical application by using nonchemical methods.	*Instrumentalism, Goals, Concerns of the Environment*	IGC9	Y
It is important to reduce pest control chemicals by using alternative methods.	*Instrumentalism, Goals, Concerns of the Environment*	IGC10	Y
I am motivated by a business opportunity.	*Instrumentalism, Goals, Economic Goals*	IGE1	
I farm for economic self-interest.	*Instrumentalism, Goals, Economic Goals*	IGE2	
I prioritize farmer and farmworker wellbeing over price.	*Instrumentalism, Goals, Economic Goals*	IGE3	

My economic interest is the most important factor in my decision-making process.	*Instrumentalism, Goals, Economic Goals*	IGE4	Y
I purchase the food I do to support the community.	*Instrumentalism, Goals, Economic Goals*	IGE5	
Economic success is not the only important factor in farming.	*Instrumentalism, Goals, Economic Goals*	IGE6	Y
I am motivated by health concern.	*Instrumentalism, Goals, Health*	IGH1	Y
The main benefit of my products is that they are safe and healthy.	*Instrumentalism, Goals, Health*	IGH2	Y
I am motivated by concerns in the conventional food system.	*Instrumentalism, Goals, Local Food System*	IGL1	Y
The main benefit of my products is that they are locally produced.	*Instrumentalism, Goals, Local Food System*	IGL2	
I purchase the food I do because it supports a local farm.	*Instrumentalism, Goals, Local Food System*	IGL3	Y
I purchase the food I do because it is local.	*Instrumentalism, Goals, Local Food System*	IGL4	
It is important that my food is produced locally.	*Instrumentalism, Goals, Local Food System*	IGL5	Y
I am satisfied that my customers understand my quality and my work.	*Instrumentalism, Goals, Local Food System*	IGL6	
I am motivated to be part of a vibrant local food system.	*Instrumentalism, Goals, Local Food System*	IGL7	Y
My production is generated using local inputs.	*Instrumentalism, Inputs and Outputs, Inputs*	III1	Y
From input to final consumer, how long is your supply chain?	*Instrumentalism, Inputs and Outputs, Inputs*	III2	
I purchase my inputs locally.	*Instrumentalism, Inputs and Outputs, Inputs*	III3	
My labor lives in my community.	*Instrumentalism, Inputs and Outputs, Inputs*	III4	
I use the same vendor repeatedly.	*Instrumentalism, Inputs and Outputs, Inputs*	III5	
I am friends with my vendors.	*Instrumentalism, Inputs and Outputs, Inputs*	III6	
I use by-products as an input due to a personal relationship.	*Instrumentalism, Inputs and Outputs, Inputs*	III7	
I exchange byproducts or waste with other farmers for use an input to my production.	*Instrumentalism, Inputs and Outputs, Inputs*	III8	Y
How much of local production is generated using local inputs?	*Instrumentalism, Inputs and Outputs, Inputs*	III9	
I am able to access resources due to my community relationships.	*Instrumentalism, Inputs and Outputs, Inputs*	III10	Y

I purchase my inputs locally.	*Instrumentalism, Inputs and Outputs, Inputs*	III11	
What percent of your inputs do you purchase locally?	*Instrumentalism, Inputs and Outputs, Inputs*	III12	
I am loyal to my farmer.	*Instrumentalism, Inputs and Outputs, Outputs*	IIO1	
I have a core group of repeat customers.	*Instrumentalism, Inputs and Outputs, Outputs*	IIO2	Y
I sell my product locally.	*Instrumentalism, Inputs and Outputs, Outputs*	IIO3	Y
What percent of your output do you sell locally?	*Instrumentalism, Inputs and Outputs, Outputs*	IIO4	
The labor on my farm purchases our product.	*Instrumentalism, Inputs and Outputs, Outputs*	IIO5	
I brand my product.	*Instrumentalism, Inputs and Outputs, Outputs*	IIO6	
I sell my product in local markets.	*Instrumentalism, Inputs and Outputs, Outputs*	IIO7	
I sell my product to a distributor or blender.	*Instrumentalism, Inputs and Outputs, Outputs*	IIO8	Y
My output is diverse.	*Instrumentalism, Inputs and Outputs, Outputs*	IIO9	Y
From your farm to the consumers' home, how many hands does your product touch?	*Instrumentalism, Inputs and Outputs, Outputs*	IIO10	
I exchange labor for product.	*Instrumentalism, Inputs and Outputs, Reciprocity*	IIR1	Y
I meet people when shopping.	*Instrumentalism, Social Connection, Bond between farmers and consumers*	ISB1	
I know my farmer.	*Instrumentalism, Social Connection, Bond between farmers and consumers*	ISB2	Y
I talk with my farmer regularly.	*Instrumentalism, Social Connection, Bond between farmers and consumers*	ISB3	
I can talk to my farmer.	*Instrumentalism, Social Connection, Bond between farmers and consumers*	ISB4	
My farmer is friendly.	*Instrumentalism, Social Connection, Bond between farmers and consumers*	ISB5	
The relationship I share with my customers creates mutual loyalty.	*Instrumentalism, Social Connection, Bond between farmers and consumers*	ISB6	Y

I frequently communicate with my final customers.	*Instrumentalism, Social Connection, Bond between farmers and consumers*	ISB7	
Talking with consumers allows me to establish a personal relationship.	*Instrumentalism, Social Connection, Bond between farmers and consumers*	ISB8	Y
It is important to have consumers visit the farm.	*Instrumentalism, Social Connection, Bond between farmers and consumers*	ISB9	
I know my farmer's name.	*Instrumentalism, Social Connection, Bond between farmers and consumers*	ISB10	
I know who produced the food I eat.	*Instrumentalism, Social Connection, Bond between farmers and consumers*	ISB11	Y
I know the consumers who eat the food I produce.	*Instrumentalism, Social Connection, Bond between farmers and consumers*	ISB12	Y
I know workers on other farms.	*Instrumentalism, Social Connection, Bond between farmers and consumers*	ISB13	
I am part of my community.	*Instrumentalism, Social Connection, Bond between farmers and consumers*	ISB14	
I am satisfied with my community involvement.	*Instrumentalism, Social Connection, Community Volunteerism/Events/Connection*	ISC1	
My farm hosts community events.	*Instrumentalism, Social Connection, Community Volunteerism/Events/Connection*	ISC2	
Customers provide volunteer labor on my farm.	*Instrumentalism, Social Connection, Community Volunteerism/Events/Connection*	ISC3	Y
I feel connected to my food.	*Instrumentalism, Social Connection, Community Volunteerism/Events/Connection*	ISC4	Y
I provide labor to other farmers when in need.	*Instrumentalism, Social Connection, Community Volunteerism/Events/Connection*	ISC5	Y
I volunteer in the community.	*Instrumentalism, Social Connection, Community Volunteerism/Events/Connection*	ISC6	
I use volunteer labor.	*Instrumentalism, Social Connection, Community Volunteerism/Events/Connection*	ISC7	

I feel a deep connection to my community.	*Instrumentalism, Social Connection, Community Volunteerism/Events/Connection*	ISC8	
My industry is important to the Vermont landscape.	*Instrumentalism, Social Connection, Industry*	ISI*1	Y
I feel a sense of obligation to my customers.	*Instrumentalism, Social Connection, Networks of Relations*	ISN1	
I exchange ideas with other farmers to create solutions to problems and/or create new products.	*Instrumentalism, Social Connection, Networks of Relations*	ISN2	Y
I view other farmers as friends.	*Instrumentalism, Social Connection, Networks of Relations*	ISN3	
I view consumers as friends.	*Instrumentalism, Social Connection, Networks of Relations*	ISN4	
My position in my social network is an asset as an entrepreneur.	*Instrumentalism, Social Connection, Networks of Relations*	ISN5	
Customers help with production decisions.	*Instrumentalism, Social Connection, Networks of Relations*	ISN6	
Farmers should help other farmers if required to do so.	*Instrumentalism, Social Connection, Networks of Relations*	ISN7	
I have relationships with other farms.	*Instrumentalism, Social Connection, Networks of Relations*	ISN8	Y
I am part of a trade organization.	*Instrumentalism, Social Connection, Networks of Relations*	ISN9	Y
I am friends with managers of other farms.	*Instrumentalism, Social Connection, Networks of Relations*	ISN10	
I am friends with other farmers.	*Instrumentalism, Social Connection, Networks of Relations*	ISN11	
I have a cooperative arrangement with other farms.	*Instrumentalism, Social Connection, Networks of Relations*	ISN12	
I settle disputes with other farmers out of court.	*Instrumentalism, Social Connection, Networks of Relations*	ISN13	
I am friends with workers on other farms.	*Instrumentalism, Social Connection, Networks of Relations*	ISN14	

I have good relationships with the other farm workers on my farm.	*Instrumentalism, Social Connection, Networks of Relations*	ISN15	
How large is your business network?	*Instrumentalism, Social Connection, Networks of Relations*	ISN16	
How many actors and hierarchical levels are within your farm?	*Instrumentalism, Social Connection, Networks of Relations*	ISN17	
I donate excess food to food banks, shelters, hospitals, or somewhere else.	*Instrumentalism, Social Connection, Redistribution*	ISR1	Y
I participate in gleaning programs.	*Instrumentalism, Social Connection, Redistribution*	ISR2	Y
I give my food to an organization who distributes my food to the final consumer.	*Instrumentalism, Social Connection, Redistribution*	ISR3	
I pool products from other farmers and distribute it.	*Instrumentalism, Social Connection, Redistribution*	ISR4	
I give products to other farmers who distribute it.	*Instrumentalism, Social Connection, Redistribution*	ISR5	Y
Farmers are an important part of a community.	*Instrumentalism, Values, Community Importance*	IVC1	
It is important for farmers to be respected members of the community.	*Instrumentalism, Values, Community Importance*	IVC2	Y
The community within which I operate is an important motivation in my work.	*Instrumentalism, Values, Community Importance*	IVC3	
I would like to stop farming.	*Instrumentalism, Values, Instrumental and Relational Values in Action*	IVI1	Y
Organic farming is a fad.	*Instrumentalism, Values, Instrumental and Relational Values in Action*	IVI2	
Young people should not be encouraged to go into farming.	*Instrumentalism, Values, Instrumental and Relational Values in Action*	IVI3	Y
Meeting consumers improves my sensitivity to food safety.	*Instrumentalism, Values, Instrumental and Relational Values in Action*	IVI4	
Other employment would be better than farming.	*Instrumentalism, Values, Instrumental and Relational Values in Action*	IVI5	
I would farm even if an easier job were available.	*Instrumentalism, Values, Instrumental and Relational Values in Action*	IVI6	Y
Community values are an important factor in my decision-making.	*Instrumentalism, Values, Instrumental and Relational Values in Action*	IVI7	

I farm because it is aligned with my values.	*Instrumentalism, Values, Instrumental and Relational Values in Action*	IVI8	Y
I farm because it is important to me.	*Instrumentalism, Values, Instrumental and Relational Values in Action*	IVI9	
I farm to make a profit.	*Instrumentalism, Values, Instrumental and Relational Values in Action*	IVI10	Y
I farm because it is a good business opportunity.	*Instrumentalism, Values, Instrumental and Relational Values in Action*	IVI11	
I farm because it is part of my heritage.	*Instrumentalism, Values, Instrumental and Relational Values in Action*	IVI12	Y
I am motivated by environmental concern.	*Instrumentalism, Values, Land Stewardship/Relation to Nature*	IVL1	Y
Attachment to the land is important for production.	*Instrumentalism, Values, Land Stewardship/Relation to Nature*	IVL2	Y
Land stewardship maintains farm resources.	*Instrumentalism, Values, Land Stewardship/Relation to Nature*	IVL3	Y
I have a deep connection with my product.	*Instrumentalism, Values, Land Stewardship/Relation to Nature*	IVL4	
Meeting consumers improves my sensitivity to the environment.	*Instrumentalism, Values, Land Stewardship/Relation to Nature*	IVL5	
I see nature a resource to use.	*Instrumentalism, Values, Land Stewardship/Relation to Nature*	IVL6	Y
I see nature as a resource to conserve.	*Instrumentalism, Values, Land Stewardship/Relation to Nature*	IVL7	Y
The main benefit of my products is that they taste good.	*Instrumentalism, Values, Non-production values*	IVN1	Y
I farm because the relationship between the land and our food is important to me.	*Instrumentalism, Values, Non-production values*	IVN2	Y
Living and working in the community is more important than a salary or profit.	*Instrumentalism, Values, Salary vs. Community Member*	IVS1	Y
I would use local byproducts even if they cost more.	*Marketness, Costs, By-product Use*	MCB1	
It is important to use local byproducts as inputs to my production.	*Marketness, Costs, By-product Use*	MCB2	
My operating costs are a challenge to my business.	*Marketness, Costs, Operating Costs*	MCO1	
My revenues are too low.	*Marketness, Costs, Operating Costs*	MCO2	
My costs are too high.	*Marketness, Costs, Operating Costs*	MCO3	

I meet my annual operating costs.	*Marketness, Costs, Operating Costs*	MCO4	
I am satisfied with my ability to meet annual operating costs.	*Marketness, Costs, Operating Costs*	MCO5	
Cost is the biggest factor in my supply decisions.	*Marketness, Costs, Operating Costs*	MCO6	Y
I use byproducts because they cost less.	*Marketness, Costs, Operating Costs*	MCO 7	Y
Locality and relationships are the biggest factor in my supply decisions.	*Marketness, Costs, Transportation Costs*	MCT1	
I would use a local supplier more if they were cheaper.	*Marketness, Costs, Transportation Costs*	MCT2	
Earning enough revenue is a major concern of my business.	*Marketness, Decision Drivers, Profit*	MDF1	
I farm in order to make a lot of money.	*Marketness, Decision Drivers, Profit*	MDF2	
Profit maximization is a priority for me.	*Marketness, Decision Drivers, Profit*	MDF3	Y
I am motivated by a monetary return for my labor.	*Marketness, Decision Drivers, Profit*	MDF4	
Good food and community are more important than profit.	*Marketness, Decision Drivers, Profit*	MDF5	
My farming activity is money-oriented.	*Marketness, Decision Drivers, Profit*	MDF6	
Paying the bills is more important than the work I do on the farm.	*Marketness, Decision Drivers, Profit*	MDF7	
Paying the bills is important, but I do this work for other reasons.	*Marketness, Decision Drivers, Profit*	MDF8	Y
I have increased production intensity due to falling profits.	*Marketness, Decision Drivers, Profit*	MDF9	Y
I have stopped agroecological practices or shifted from organic due to falling profits.	*Marketness, Decision Drivers, Profit*	MDF10	
I have postponed investment in soil or conservation due to falling profits.	*Marketness, Decision Drivers, Profit*	MDF11	Y
My donations of excess food have decreased due to falling profits.	*Marketness, Decision Drivers, Profit*	MDF12	
I have decreased gleaning programs due to falling profits.	*Marketness, Decision Drivers, Profit*	MDF13	Y
I have stopped accepting EBT due to falling profits.	*Marketness, Decision Drivers, Profit*	MDF14	
I am as profitable as I would like.	*Marketness, Decision Drivers, Profit*	MDF15	
How profitable are you?	*Marketness, Decision Drivers, Profit*	MDF16	
I am satisfied with my financial security.	*Marketness, Decision Drivers, Profit*	MDF17	

Feeding the community is more pride-worthy than profits.	*Marketness, Decision Drivers, Profit*	MDF18	
I would farm even if it were not profitable.	*Marketness, Decision Drivers, Profit*	MDF19	
It is more important to be profitable than to feed the community.	*Marketness, Decision Drivers, Profit*	MDF20	Y
A farm is a business to be run efficiently.	*Marketness, Decision Drivers, Profit*	MDF21	
Profitability is my main motivation in farming.	*Marketness, Decision Drivers, Profit*	MDF22	Y
Profit is an important factor in my decision-making.	*Marketness, Decision Drivers, Profit*	MDF23	
My farm's profitability is important in my production decisions.	*Marketness, Decision Drivers, Profit*	MDF24	
My farm's profitability is the most important factor for me.	*Marketness, Decision Drivers, Profit*	MDF25	
I farm because it is profitable.	*Marketness, Decision Drivers, Profit*	MDF26	
Getting the price right is a challenge to my business.	*Marketness, Decision Drivers, Price*	MDP1	
My prices are below market prices.	*Marketness, Decision Drivers, Price*	MDP2	Y
The attachment to the land is important for sales.	*Marketness, Decision Drivers, Price*	MDP3	
I have control over my own prices.	*Marketness, Decision Drivers, Price*	MDP4	
Competition has driven prices down.	*Marketness, Decision Drivers, Price*	MDP5	
I accept EBT or have lower prices for low-income households.	*Marketness, Decision Drivers, Price*	MDP6	Y
I make purchase decisions due to price.	*Marketness, Decision Drivers, Price*	MDP7	
Price is a way I differentiate myself.	*Marketness, Decision Drivers, Price*	MDP8	Y
A differentiated product offering is more important than price when choosing a product to purchase.	*Marketness, Decision Drivers, Price*	MDP9	
Competition constrains my ability to raise prices.	*Marketness, Decision Drivers, Price*	MDP10	
I keep my prices low to keep my food affordable.	*Marketness, Decision Drivers, Price*	MDP11	Y
The value of my food is a primary concern for me.	*Marketness, Decision Drivers, Price*	MDP12	
I am willing to pay more for a local product.	*Marketness, Decision Drivers, Price*	MDP13	Y
It is important to pay attention to market prices.	*Marketness, Decision Drivers, Price*	MDP14	

The price my product will receive in the market is important in my production decisions	*Marketness, Decision Drivers, Price*	MDP15	Y
The price of my produce is the most important factor in decision making.	*Marketness, Decision Drivers, Price*	MDP16	Y
I would still purchase this product if it were more expensive.	*Marketness, Decision Drivers, Price*	MDP17	
I make decisions based upon price more often than other considerations.	*Marketness, Decision Drivers, Price*	MDP18	Y
Land security is a challenge to my business.	*Marketness, Fictitious Commodities, Land*	MFL1	Y
My land is subsidized.	*Marketness, Fictitious Commodities, Land*	MFL2	
The lease on the land I farm is lower than the market rate.	*Marketness, Fictitious Commodities, Land*	MFL3	
Do you own your land?	*Marketness, Fictitious Commodities, Land*	MFL4	
My mortgage payment is my largest cost.	*Marketness, Fictitious Commodities, Land*	MFL5	
Farmland should be fully productive.	*Marketness, Fictitious Commodities, Land*	MFL6	
My mortgage payment is a factor in my decisions.	*Marketness, Fictitious Commodities, Land*	MFL7	Y
I would like to pay myself more.	*Marketness, Fictitious Commodities, Land*	MFL8	Y
Access to credit is a challenge to my business.	*Marketness, Fictitious Commodities, Money*	MFM1	Y
The mortgage rate on my land is a concern.	*Marketness, Fictitious Commodities, Money*	MFM2	
I am satisfied with my ability to build/maintain farm infrastructure.	*Marketness, Fictitious Commodities, Money*	MFM3	
Short term loans are necessary to farming.	*Marketness, Fictitious Commodities, Money*	MFM4	
Access to capital is necessary to farming.	*Marketness, Fictitious Commodities, Money*	MFM5	
I am in debt.	*Marketness, Fictitious Commodities, Money*	MFM6	Y
Access to credit is a factor in my decisions.	*Marketness, Fictitious Commodities, Money*	MFM7	
I am able to pay my debts with my farm income.	*Marketness, Fictitious Commodities, Money*	MFM8	
Hiring labor is a challenge to my business.	*Marketness, Fictitious Commodities, Labor*	MFX1	
Paying labor is a challenge to my business.	*Marketness, Fictitious Commodities, Labor*	MFX2	Y
I have had to cut labor wages or hours to maintain profit margins.	*Marketness, Fictitious Commodities, Labor*	MFX3	

I am satisfied with my compensation.	*Marketness, Fictitious Commodities, Labor*	MFX4	
I am satisfied with how my farm compensates its workers.	*Marketness, Fictitious Commodities, Labor*	MFX5	
I use volunteer labor on my farm.	*Marketness, Fictitious Commodities, Labor*	MFX6	
I use family labor on my farm.	*Marketness, Fictitious Commodities, Labor*	MFX7	
I use unpaid labor on my farm due to relationships I have.	*Marketness, Fictitious Commodities, Labor*	MFX8	Y
I exchange labor with other farmers.	*Marketness, Fictitious Commodities, Labor*	MFX9	
How are labor price and quantity determined (1=profit; 7=good work).	*Marketness, Fictitious Commodities, Labor*	MFX10	
Labor cost is a factor in my decisions.	*Marketness, Fictitious Commodities, Labor*	MFX11	
I wish I could pay labor more.	*Marketness, Fictitious Commodities, Labor*	MFX12	Y
Low consumer demand is a challenge to my business.	*Marketness, Market Dynamics, Demand*	MMD1	
Meeting consumer demand is less important than other motivations	*Marketness, Market Dynamics, Demand*	MMD2	
Competition is a challenge to my business.	*Marketness, Market Dynamics, Perceived Competition*	MMP1	Y
Competition has driven my profit down.	*Marketness, Market Dynamics, Perceived Competition*	MMP2	
I have decreased my own salary due to competitive pressures.	*Marketness, Market Dynamics, Perceived Competition*	MMP3	Y
I have experienced overwork due to competitive pressures.	*Marketness, Market Dynamics, Perceived Competition*	MMP4	
I am less satisfied with my work due to competitive pressures.	*Marketness, Market Dynamics, Perceived Competition*	MMP5	
I have thought of leaving farming due to competitive pressures.	*Marketness, Market Dynamics, Perceived Competition*	MMP6	
Increased competition limits my ability to socialize with consumers.	*Marketness, Market Dynamics, Perceived Competition*	MMP7	Y
Increased competition limits my ability to host events.	*Marketness, Market Dynamics, Perceived Competition*	MMP8	
Competition limits my ability to request pre-payment.	*Marketness, Market Dynamics, Perceived Competition*	MMP9	
Increased competition has led me to differentiate my product.	*Marketness, Market Dynamics, Perceived Competition*	MMP10	
Increased competition has led me to create a stronger bond with consumers.	*Marketness, Market Dynamics, Perceived Competition*	MMP11	
How do you view level of competition between yourself and: direct market, retail market, home delivery, online?	*Marketness, Market Dynamics, Perceived Competition*	MMP12	

Appendix C: Sample Survey

Producer Question	Theoretical Category	Code
I access techniques from my network that are a benefit to my farm.	*Instrumentalism, Shared Commitment, Information Transfer*	ICI3
I share production risk with my customers.	*Instrumentalism, Shared Commitment, Risk*	ICR2
My work is financially risky.	*Instrumentalism, Shared Commitment, Risk*	ICR5
I trust other farmers in my network.	*Instrumentalism, Shared Commitment, Trust*	ICT1
I have a reputation for being flexible to my customers' needs.	*Instrumentalism, Shared Commitment, Trust*	ICT5
My customers form a supportive community around my farm.	*Instrumentalism, Shared Commitment, Uncertainty*	ICU2
The commitment of my local community helps reduce uncertainty and risk in my farm.	*Instrumentalism, Shared Commitment, Uncertainty*	ICU7
I attempt to maintain/improve soil quality.	*Instrumentalism, Goals, Concerns of the Environment*	IGC5
I prefer an integrated pest management approach to reduce practices that harm the environment.	*Instrumentalism, Goals, Concerns of the Environment*	IGC9
My economic interest is the most important factor in my decision-making process.	*Instrumentalism, Goals, Economic Goals*	IGE4
Economic success is not the only important factor in farming.	*Instrumentalism, Goals, Economic Goals*	IGE6
The main benefit of the food I produce is that it is safe and healthy.	*Instrumentalism, Goals, Health*	IGH2
I am motivated in my farming decisions by problems in the conventional food system.	*Instrumentalism, Goals, Local Food System*	IGL1
It is important to reduce pest control chemicals by using alternative methods.	*Instrumentalism, Goals, Concerns of the Environment*	IGC10
I am motivated to be part of a vibrant local food system.	*Instrumentalism, Goals, Local Food System*	IGL7
My production is generated using mostly local inputs.	*Instrumentalism, Inputs and Outputs, Inputs*	III1
I exchange byproducts or waste with other farmers for use an input to my production.	*Instrumentalism, Inputs and Outputs, Inputs*	III8
I am able to access resources and byproducts due to my personal relationships.	*Instrumentalism, Inputs and Outputs, Inputs*	III10
I have a core group of repeat customers.	*Instrumentalism, Inputs and Outputs, Outputs*	IIO2
I sell my product locally.	*Instrumentalism, Inputs and Outputs, Outputs*	IIO3
I sell my product to a distributor or blender.	*Instrumentalism, Inputs and Outputs, Outputs*	IIO8

My output is diverse.	*Instrumentalism, Inputs and Outputs, Outputs*	IIO9
I exchange my product for labor.	*Instrumentalism, Inputs and Outputs, Reciprocity*	IIR1
The relationship I share with my customers creates mutual loyalty.	*Instrumentalism, Social Connection, Bond between farmers and consumers*	ISB6
Talking with consumers allows me to establish a personal relationship.	*Instrumentalism, Social Connection, Bond between farmers and consumers*	ISB8
I know the consumers who eat the food I produce.	*Instrumentalism, Social Connection, Bond between farmers and consumers*	ISB12
Customers provide volunteer labor on my farm.	*Instrumentalism, Social Connection, Community Volunteerism/Events/Connection*	ISC3
I provide labor or other assistance to other farmers when they in need.	*Instrumentalism, Social Connection, Community Volunteerism/Events/Connection*	ISC5
My industry is important to the Vermont community.	*Instrumentalism, Social Connection, Industry*	ISI1
I exchange ideas with other farmers to create solutions to problems and/or create new products.	*Instrumentalism, Social Connection, Networks of Relations*	ISN2
I have cooperative relationships with other farms.	*Instrumentalism, Social Connection, Networks of Relations*	ISN8
I am part of a trade organization	*Instrumentalism, Social Connection, Networks of Relations*	ISN9
I donate excess food to food banks, shelters, hospitals, or somewhere else.	*Instrumentalism, Social Connection, Redistribution*	ISR1
I participate in gleaning programs.	*Instrumentalism, Social Connection, Redistribution*	ISR2
I belong to a cooperative.	*Instrumentalism, Social Connection, Redistribution*	ISR5
It is important for farmers to be respected members of the community.	*Instrumentalism, Values, Community Importance*	IVC2
I would like to stop farming.	*Instrumentalism, Values, Instrumental and Relational Values in Action*	IVI1
Young people should not be encouraged to go into farming.	*Instrumentalism, Values, Instrumental and Relational Values in Action*	IVI3

I would farm regardless of other options.	*Instrumentalism, Values, Instrumental and Relational Values in Action*	IVI6
I farm because it is aligned with my values.	*Instrumentalism, Values, Instrumental and Relational Values in Action*	IVI8
I farm to make a profit.	*Instrumentalism, Values, Instrumental and Relational Values in Action*	IVI10
I farm because it is part of my heritage.	*Instrumentalism, Values, Instrumental and Relational Values in Action*	IVI12
I am motivated to improve the natural environment around my farm.	*Instrumentalism, Values, Land Stewardship/Relation to Nature*	IVL1
Land stewardship is critical to producing a good product.	*Instrumentalism, Values, Land Stewardship/Relation to Nature*	IVL3
I see nature a resource to use.	*Instrumentalism, Values, Land Stewardship/Relation to Nature*	IVL6
I see nature as a resource to conserve.	*Instrumentalism, Values, Land Stewardship/Relation to Nature*	IVL7
The main benefit of my products is that they taste good.	*Instrumentalism, Goals, Concerns of the Environment*	IGC1
I farm because the relationship between the land and our food is important to me.	*Instrumentalism, Values, Non-food benefits*	IVN2
Living in the community and working the land is more important than a salary or profit.	*Instrumentalism, Values, Salary vs. Community Member*	IVS1
Cost is the biggest factor in my supply decisions.	*Marketness, Costs, Operating Costs*	MCO6
I use byproducts primarily because they cost less.	*Marketness, Costs, Operating Costs*	MCO7
Profit maximization is a priority for me.	*Marketness, Decision Drivers, Profit*	MDF3
Paying the bills is important, but I do this work for other reasons.	*Marketness, Decision Drivers, Profit*	MDF8
I have increased production intensity due to falling profits.	*Marketness, Decision Drivers, Profit*	MDF9
I have postponed investment in soil or conservation due to falling profits.	*Marketness, Decision Drivers, Profit*	MDF11
I have decreased donations or gleaning programs due to falling profits.	*Marketness, Decision Drivers, Profit*	MDF13
It is more important to be profitable than to feed the community.	*Marketness, Decision Drivers, Profit*	MDF20
Profitability is my main motivation in farming.	*Marketness, Decision Drivers, Profit*	MDF22
My prices are below market prices.	*Marketness, Decision Drivers, Price*	MDP2

I accept EBT or have lower prices for low-income households.	*Marketness, Decision Drivers, Price*	MDP6
Price is a way I differentiate myself.	*Marketness, Decision Drivers, Price*	MDP8
I keep my prices low to keep my food affordable.	*Marketness, Decision Drivers, Price*	MDP11
I make decisions based upon price more often than other considerations.	*Marketness, Decision Drivers, Price*	MDP18
Access to land is a challenge to my business.	*Marketness, Fictitious Commodities, Land*	MFL1
My mortgage or rent payment is a major factor in my decisions.	*Marketness, Fictitious Commodities, Land*	MFL7
I would like to pay myself more.	*Marketness, Fictitious Commodities, Land*	MFL8
My debt level is a deciding factor in my decisions.	*Marketness, Fictitious Commodities, Money*	MFM6
Access to credit is a factor in my decisions.	*Marketness, Fictitious Commodities, Money*	MFM1
I would like to pay labor more.	*Marketness, Fictitious Commodities, Labor*	MFX12
I use unpaid labor on my farm due to relationships I have.	*Marketness, Fictitious Commodities, Labor*	MFX8
Competition is a challenge to my business.	*Marketness, Market Dynamics, Perceived Competition*	MMP1
I have decreased my own salary due to competitive pressures.	*Marketness, Market Dynamics, Perceived Competition*	MMP3
Increased competition has reduced my ability to institute management strategy that will improve the environment.	*Marketness, Market Dynamics, Perceived Competition*	MMP7
I have thought of leaving farming because I feel unrealistic expectations or too much responsibility to manage for environmental concerns.	*N/A*	N/A

Consumer Question	Theoretical Category	Code
I am part of a supportive community around the farm where I get my food.	*Instrumentalism, Shared Commitment, Uncertainty*	ICU2
I am committed to my local farmers.	*Instrumentalism, Shared Commitment, Uncertainty*	ICU7
I purchase the food I do because the farmer improves the soil.	*Instrumentalism, Goals, Concerns of the Environment*	IGC5
I purchase the food I do because I believe it has a lower environmental impact.	*Instrumentalism, Goals, Concerns of the Environment*	IGC6
I purchase the food I do because of the positive impacts of on the environment.	*Instrumentalism, Goals, Concerns of the Environment*	IGC7
I purchase the food I do to support the local community.	*Instrumentalism, Goals, Local Food System*	IGL3
It is important that my farmer reduces pest control chemicals by using alternative methods.	*Instrumentalism, Goals, Concerns of the Environment*	IGC10
I am motivated by the health of my food.	*Instrumentalism, Goals, Health*	IGH1
The main benefit of the food I purchase is that it is safe and healthy.	*Instrumentalism, Goals, Health*	IGH2
I am motivated in my purchase decisions by problems in the conventional food system.	*Instrumentalism, Goals, Local Food System*	IGL1
It is important that my food is produced locally.	*Instrumentalism, Goals, Local Food System*	IGL5
I am motivated to be part of a vibrant local food system.	*Instrumentalism, Goals, Local Food System*	IGL7
My consumption is generated using mostly local inputs.	*Instrumentalism, Inputs and Outputs, Inputs*	III1
I am a repeat customer.	*Instrumentalism, Inputs and Outputs, Outputs*	IIO2
I exchange my labor for farm product.	*Instrumentalism, Inputs and Outputs, Reciprocity*	IIR1
The relationship I share with my farmer creates mutual loyalty.	*Instrumentalism, Social Connection, Bond between farmers and consumers*	ISB6
Talking with my farmer allows me to establish a personal relationship.	*Instrumentalism, Social Connection, Bond between farmers and consumers*	ISB8
I know the farmer who produces the food I eat.	*Instrumentalism, Social Connection, Bond between farmers and consumers*	ISB11
I provide volunteer labor on a farm.	*Instrumentalism, Social Connection, Community Volunteerism/Events/Connection*	ISC3

I know some of my farmers.	*Instrumentalism, Social Connection, Bond between farmers and consumers*	ISB2
This industry is important to the Vermont community.	*Instrumentalism, Social Connection, Industry*	ISI1
I know who produced the food I eat.	*Instrumentalism, Social Connection, Bond between farmers and consumers*	ISB12
I volunteer in gleaning programs.	*Instrumentalism, Social Connection, Redistribution*	ISR2
I belong to a cooperative.	*Instrumentalism, Social Connection, Redistribution*	ISR5
I feel connected to my food.	*Instrumentalism, Social Connection, Community Volunteerism/Events/Connection*	ISC4
I would purchase local food regardless of other options.	*Instrumentalism, Values, Instrumental and Relational Values in Action*	IVI6
I purchase the food I do because it is aligned with my values.	*Instrumentalism, Values, Instrumental and Relational Values in Action*	IVI8
The price of local food is a consideration in my decision.	*Marketness, Decision Drivers, Price*	MDP16
Land stewardship is critical in my decision to purchase food.	*Instrumentalism, Values, Land Stewardship/Relation to Nature*	IVL2
The main benefit of the food I purchase is that it tastes good.	*Instrumentalism, Values, Non-food benefits*	IVN1
I purchase the food I do because the relationship between the land and our food is important to me.	*Instrumentalism, Values, Non-food benefits*	IVN2
Purchasing food from a community member who works the land is more important the price of my food.	*Marketness, Decision Drivers, Profit*	MDF20
Price is the biggest factor in my purchase decisions.	*Marketness, Decision Drivers, Price*	MDP15
I make decisions based upon price more often than other considerations.	*Marketness, Decision Drivers, Price*	MDP18
I am willing to pay more for a product from a farm that pays its labor fairly.	*Marketness, Fictitious Commodities, Labor*	MFX2
I am willing to pay more for a local product.	*Marketness, Decision Drivers, Price*	MDP13
I pay in advance for products to share risk with my farmer.	*Instrumentalism, Shared Commitment, Risk*	ICR3
I trust the producers of the products I buy.	*Instrumentalism, Shared Commitment, Risk*	ICT2

Appendix D: Factor Analysis How-To

This appendix will serve as a guide for developing instrumentalism and marketness scores for use on the ETM. This is meant to function as a guide only: statistical software other than that used in this guide, and/or other techniques should be explored if desired. This guide will detail how to arrive at scores for either producers or consumers in each industry. For example, these steps below may guide how to develop a score for producers in the dairy industry. This process can be repeated for consumers in the dairy industry to arrive at an embeddedness type matrix for the dairy industry. The process can then be repeated for each industry studied.

It is important to note that survey questions are in the Likert-scale form 1-5. On the ETM, a 5 indicates high levels of instrumentalism or marketness. For some questions, however, a 5 may indicate a low level of instrumentalism or marketness. For example, if a question asks, "I value my connection to the land more than profit," a score of 5 will indicate a strong connection to the land. Responses to these questions must be reversed before performing factor analysis and determining factor scores.

This guide will use SPSS. However, any statistical software can be used. While the specific directions will be different, the steps and methodology will be the same.

1. Import Data
    - In SPSS statistical software, enter the survey responses into the "Data View" tab. In this tab, the columns are the variables, or questions, while the rows are the individual respondents. Accordingly, row 1 will show all the Likert-scale question responses for respondent 1.
2. Configure Data
    - In the "Variable View" tab, change the "Measurement" column to "Ordinal" for each survey question.
    - In the "Variable View" tab, change the "Name" column to reflect the question code for each question. This will replace the default name "Var0001" with "ICR1" for example.
3. Run Factor Analysis
    - On the "Analyze" tab, choose "Dimension Reduction" and "Factor".
    - Move all Variables from the far left window to the window called "Variables:" by clicking the top blue arrow pointed right.
    - Click the "Descriptives" button and ensure "Initial Solution" in the "Statistics" box and "Coefficients" in the "Correlation Matrix" box are checked. Click "Continue".
    - Click the "Extraction" button and ensure the "Method" selected is "Principal components." In the "Analyze" box, ensure that "Correlation matrix" is selected. "In the "Display" box, ensure both "Unrotated factor solution" and "Scree plot" are selected. In the "Extract" box, choose "Fixed number of factors" and enter "2" in the box. This tells the factor analysis to extract two factors from the data. Those two factors are instrumentalism and marketness. Click "Continue".
    - Click the "Rotation" box and choose "Varimax" in the "Method" box and check off "Rotated solution" in the "Display" box. Click "Continue".
    - Click the "Options" box and choose "Exclude cases pairwise" within the "Missing values" box. In the "Coefficient Display Format" box, select "Sorted by Size" and "Suppress small coefficients," and enter ".30" within the "Absolute value below:" box. This will organize the output, but will not have any impact on the analysis itself.

- Click “OK” to run the factor analysis.

4. Interpret the Factor Analysis Output.
   - The first chart is the “Correlation Matrix.” This chart simply displays the correlation between a particular question and all the other questions.
   - The “Communalities” chart refers to the amount of variance in each question that can be explained by the two factors defined in the preceding step.
   - The “Total Variance Explained” chart is similar to the “Communalities” chart but tells how much of the *total* variance is explained by the two factors that were chosen.
   - The “Scree Plot” summarizes the eigenvalues of the components. All components with an eigenvalue above 1 are potential factors. While we told the factor analysis to extract 2 factors, the scree plot is useful to confirm if 2 factors is appropriate. If 5 components, for example, have eigenvalues above 1, there may be some other factors, other than instrumentalism and marketness, causing the responses we see in the. In such a case, it would be important to look at the data and see if questions should be thrown out or re-assessed. It would be possible to run the factor analysis again instructing, in the “Extraction” button, the analysis to extract all factors with eigenvalues above 1.
   - For the purposes of this study, the “Rotated Component Matrix” is the most important. This chart gives values from -1 to 1, known as factor loads, that estimate the correlation between each of the variables and the factors. In other words, it displays the importance of the underlying factor in each question. Very high values indicate that a particular question is strongly informed by the underlying factor.
5. Determine Factors
   - The questions that load onto Components 1 and 2, respectively, in the “Rotated Component Matrix” should be reviewed to name the components. Examining the variables, e.g. ICR1, that load onto the component should reveal which components should be named instrumentalism and marketness, respectively.
   - The “Rotated Component Matrix” will deliver factor loadings and organize questions into the factors with which they have the highest loading. This may differ slightly from the theoretical construct. For example, a certain question that was theorized to be influenced by an individual’s instrumentalism, may be grouped with the questions associated with the marketness factor.
6. Creating Factor Scores
   - For each factor, add the factor loads of each variable. This will yield a **total factor weight** for each factor. For example, if a factor contains 9 questions, each with a factor load of .75, the factor weight for that factor would be 6.75.
   - For each question, divide the factor load by the **total factor weight** for the factor it loads on, from above. This will give a **factor weight score** for each question. For example, a question with a factor load of .8 that is part of a factor with a factor weight of 8.5 will have a factor weight score of .094
   - For each individual, multiply each **question response**, 1-5, by the **factor weight score** for that question, determined above. For example, a respondent who answered 3 for a particular question with a factor weight score of .094 would have a **question score** of .282.
   - For each individual, add all the **question scores** for each factor. This will yield two scores on a scale of 1-5, one for the questions associated with Instrumentalism and one for the questions associated with Marketness.

7. Creating the Embeddedness Type Matrix
    - Likert-scale responses are on a positive scale of 1 to 5. The ETM, however, contains two scales of -1 to 1. Accordingly, the scores determined above must be normalized. The following steps will detail this process.
    - Subtract 3 from each individual respondent's instrumentalism and marketness score. For example, if an individual had an instrumentalism score of 2.3 and a marketness score of 3.7, their new score would be -.7 and .7, respectively. This, however, is still on a 5-point scale from -2 to 2.
    - Divide each score from the above step by 2. This will normalize the score to -1 to 1. In the above example, the instrumentalism score would be -.35, while the marketness score would be .35.
    - At this point, a chart can be created with each individual's instrumentalism and marketness score. Ensure that the y-axis draws upon data for the instrumentalism factor, while the x-axis draws upon data for the marketness factor.

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