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You can know your school and feed it too: Vermont farmers' motivations and distribution practices in direct sales to school food services

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Abstract Farm to School (FTS) programs are increasingly popular as methods to teach students about food, nutrition, and agriculture by connecting students with the sources of the food that they eat. They may also provide opportunity for farmers seeking to diversify market channels. Food service buyers in FTS programs often choose to procure food for school meals directly from farmers. The distribution practices required for such direct procurement often bring significant transaction costs for both school food service professionals and farmers. Analysis of data from a survey of Vermont farmers who sell directly to school food services explores farmers' motivations and distribution practices in these partnerships. A two-step cluster analysis procedure characterizes farmers' motivations along a continuum between market-based and socially embedded values. Further bivariate analysis shows that farmers who are motivated most by market-based values are significantly associated with distribution practices that facilitate sales to school food services. Implications for technical assistance to facilitate these sales are discussed.

Keywords Farm to School · Local food · Farmer motivations · Food distribution · Vermont

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Abbreviations

FTS	Farm to School
NSLP	National School Lunch Program
VAAFM	Vermont Agency of Agriculture Food and Markets
VT FEED	Vermont Food Education Every Day

Introduction

Scholars have referred to Farm to School (FTS) as one of the most important elements of the alternative agri-food movement (Izumi et al. 2009; Kloppenburg et al. 2008). The first FTS initiatives appeared in the mid-1990s, although many school food service operations sourced locally grown foods prior to this time. FTS programs have two major components: (1) procurement and preparation of locally produced foods for school meals and (2) experience-based educational activities addressing the agricultural, culinary, and nutritional qualities of such foods (Schafft et al. 2010). Supporters see FTS bringing a broad array of potential benefits along two broad dimensions: improved childhood nutrition and farm viability. These dimensions mirror the overarching goals of the National School Lunch Program (NSLP) (USDA Food and Nutrition Service 2009).

Much of the literature on FTS focuses on the perspectives of school food service operations; these studies identify an array of daunting policy, financial, and distribution barriers that limit the scope of FTS (Vogt and Kaiser 2008). Furthermore, FTS is not a standardized, one size fits all prescription, but rather is characterized by heterogeneous and innovative practices that reflect the needs and

resources of the participating school districts and farmers (Izumi et al. 2010b; Schafft et al. 2010). More recently, FTS has been described in terms of complex networks that include federal, state, local, and household levels (Conner et al. 2011a). While several studies have explored the needs and practices of participating food service professionals, fewer have included the perspective of farmers (Joshi et al. 2008; Izumi et al. 2010b). Furthermore, there is little research on distribution mechanisms by which farmers overcome barriers to supply schools. Farmer perspectives are important in light of persistent farm profitability issues nationwide; a majority of US farms earned negative net income in both 2002 and 2007 (USDA-NASS 2007). Farms are by definition an indispensable component of FTS programs: if farms are unable to participate or derive no benefit, the potential benefits of FTS will not be realized.

This study addresses this gap in the literature through analysis of data from a survey of Vermont farmers involved in FTS programs. Specifically, it addresses these research questions: What are the motivations of farmers to participate in FTS? To what extent do farmers' dispositions fit into "socially" and "market" motivated typologies? To what extent do farmers' motivations explain the types of distribution practices they are willing to adopt in order to meet the needs of school buyers? What are the implications for technical assistance?

Background

The number of FTS programs has doubled since 2008–2206 (Bagdonis et al. 2009; Center for Food and Justice 2010). FTS programs are particularly well established in Vermont. Vermont Food Education Every Day (VT FEED) is the state's leading organization focused on FTS programming, providing technical assistance to more than one-third of Vermont's 300 schools over 10 years (VT FEED no date). The longevity of Vermont's experience suggests that a focus on Vermont farmers' participation can offer useful context and insights to FTS program development elsewhere.

The literature on FTS programs across the country defines two main component activities: (1) procurement and preparation of locally produced foods for school meals and (2) experience-based educational activities addressing the agricultural, culinary, and nutritional qualities of such foods (Schafft et al. 2010). FTS goals (e.g., healthy kids and viable local farms) roughly mirror NSLP goals.

Local food procurement supports attainment of four FTS program objectives: (1) improve students' nutritional intake (Derwingson 2008; Izumi et al. 2006; Joshi et al. 2008; Kantor 2001; Minnesota School Nutrition Association and Institute for Agriculture and Trade Policy 2008; Strohbehn and Gregoire 2001); (2) create markets for small- and medium-sized farmers in the schools' own communities and regions (Derwingson 2008; Izumi et al. 2006; Joshi et al. 2008; Joshi and Beery 2007; Kloppenburg et al. 2007, 2008; Minnesota School Nutrition Association and Institute for Agriculture and Trade Policy 2008; National Farm to School Network et al. 2009; Ratcliffe and Smith 2007; Ryan 2006; Strohbehn and Gregoire 2001; Tropp and Olowolayemo 2000); (3) strengthen local economies by spending a greater percentage of school food services' budgets on foods produced nearby (Bagdonis et al. 2009; Berkenkamp 2006; Derwingson 2008; Izumi et al. 2006; Minnesota School Nutrition Association and Institute for Agriculture and Trade Policy 2008; Ratcliffe and Smith 2007); and (4) enhance the natural environment by supporting sustainable agricultural practices (Bagdonis et al. 2009; Izumi et al. 2009; Morgan and Sonnino 2008). The experiential educational component of FTS aims to increase students' appreciation, preference for, and consumption of healthful foods that are produced locally in an environmentally sound manner, and is often portrayed as the overarching goal of FTS programs (Bagdonis et al. 2009; Croom 2005; Graham et al. 2004; Haase et al. 2004; Joshi et al. 2008; Joshi and Beery 2007; Morris et al. 2000; Kloppenburg and Hassanein 2006).

Several authors identify FTS programs as having a strong impact on the quality of nutrition education because they can connect students with the producers of the food they eat (Derwingson 2008; Joshi et al. 2008; Joshi and Beery 2007). Empirical evidence for this connection is scant, although school food service directors in a set of case studies reported that students may be more eager to consume fresh fruits and vegetables if they have interacted with the farmers who produced them through experiential educational activities such as field trips to farms (Izumi et al. 2010a).

These barriers have mainly been examined from the perspectives of school food services. One of the most prominently cited barriers is the higher cost of locally produced food as compared to that of conventional foods sourced through the ordinary supply chains used by school food services, which are normally mainline distributors and the United States Department of Agriculture's Child Nutrition Commodities Program. This barrier is compounded by several factors. First, school food services' budgets are limited by low rates of federal reimbursements per meal as well as by their responsibility to make up budget deficits by generating revenue through sales of meals and other a la carte food items, making innovation difficult. Second, foods sourced directly from local farmers are often whole or in forms that school food services cannot easily store or prepare, especially given the disconnect between the growing season and the school year,

particularly in northern climates. The lack of reliable supply creates difficulty in menu planning. And, many school food service directors cite high transaction costs of managing accounts of multiple farmers as a barrier; as a result, food service directors prefer to purchase from fewer broadline distributors with whom they have established streamlined procurement practices (Berkenkamp 2006; Izumi et al. 2009, 2006; Kloppenburg et al. 2007).

Barriers to farmer participation mirror those above, and include the low prices that farmers generally receive from school food service customers and an inefficient infrastructure for wholesale distribution by small- and medium-sized farms. These factors together seem to keep FTS sales from significantly augmenting the incomes of participating farmers (Izumi et al. 2010b; Joshi et al. 2008; National Farm to School Network et al. 2009; Strohbehn and Gregoire 2001).

Accordingly, the economic incentives for farmers to sell directly to school food services appear to be ancillary to other needs and desires. A recent case study found that farmers did not sell much produce to schools, but that these sales diversified their ordinary markets, provided outlets for products they could not sell elsewhere, and slightly supplemented their incomes during the fall and winter months (Izumi et al. 2010b). Another study found that school food services can be a market for unexpected surpluses as well as slightly blemished produce (Conner et al. 2011b). In the Izumi et al. (2010b) study, economic goals were offset by a host of motivations surrounding improved childhood nutrition and contributions to overall community well-being. Also noteworthy was the importance of the social relationships between farmers and school food service directors, which provided both motivation for participation and enabled an array of "creative purchasing" and "give and take" (Izumi et al. 2010b, p. 380) mechanisms which helped to overcome distribution and pricing barriers. Examples of these creative mechanisms include: using school mail trucks for food transport, one food service director dropping off food at another district school on her way home, calling local purchase programs "pilots" to skirt competitive bid regulations, and using "yield testing"—weighing final processed product rather than whole product—to make local prices per pound competitive with products grown farther away. These mechanisms align with prior studies that similarly describe FTS efforts as based on community-based, piecemeal practices that build on community assets and address local constraints (Bagdonis et al. 2009; Schafft et al. 2010). Clearly, a complex mix of economic and social motivations underpins the procurement methods discussed in these studies.

Izumi et al. (2010b) examine the complexity of farmers' and other supply chain actors' motivations for participation in FTS programs through a framework of embeddedness, marketness, and instrumentalism. This model, first developed by Block (1990), was applied to agri-food studies by Hinrichs (2000). Embeddedness is marked by social and cultural relationships, often based on a set of shared values and concerns for the food quality, environment, and community well-being (Sage 2003). Marketness, in contrast, is marked by the primacy of price in transactions, while instrumentalism is exhibited in strategic behavior based on overall economic self-interest. Hinrichs (2000) finds that farmers' markets and community supported agriculture programs are not solely based on embeddedness indicators such as trust and social connections, but rather are marked by tensions between embeddedness, marketness, and instrumentalism. Embeddedness entails the incorporation of non-market values such as territoriality, equitable payments to farmers, food quality, and health for children, into conventionally economic decision-making frameworks (Izumi et al. 2010b). The embeddedness of values like these upon which alternative agri-food networks are based in general constitutes the "hallmark" of FTS programs. Toward this end, they employ a continuum between market and non-market (socially embedded) values to explain the often hybrid motivations that farmers and other actors exhibit in FTS procurement relationships, and find that personal interaction with school food service professionals generates social benefits, which farmers said motivated them to participate in FTS programs in light of relatively small direct financial rewards. These social relationships also foster "give and take" (Izumi et al. 2010b, p. 380) and community-based solutions to common FTS barriers.

Direct sales not only allow farmers to interact with their school food service customers but also provide farmers opportunities to interact with students, the ultimate consumers of the products they grow and sell. This example of social embeddedness may be a unique hallmark of FTS programs because such experiential education may be influential in developing students' preferences for and choices of locally grown food. Furthermore, if farmers are to be understood as both market- and socially motivated, then it is important to understand not only how motivations condition their direct sales to school food services, but also how distribution concerns affect the financial benefits or drawbacks of direct sales. Given the heterogeneous and context-specific nature of FTS distribution practices, a more in-depth examination of their complex economic and social influences would contribute to a greater theoretical understanding of FTS principles as well as help to inform efforts to increase the efficacy of FTS efforts on the ground.

Researchers studying FTS often frame motivating factors as the specific aims that actors hope to accomplish through their involvement in FTS programs. One study discusses why school food service professionals are

motivated to engage in FTS programming in terms of aims. These actors show substantial potential interest in FTS, particularly in terms of how FTS might help address local needs, better the community, and improve school-community ties (Schafft et al. 2010, p. 29). Another finds that farmers sold their products to schools for two primary reasons: to diversify their marketing strategies and to contribute to social benefits through direct action (Izumi et al. 2010b). Such motivating factors led farmers to persist with these sales despite barriers that made them more difficult or less financially rewarding.

Distribution factors of FTS programs are the behind-the-scenes practicalities that influence how or whether actors are able to carry out the component activities that make up FTS programs. Studies addressing the distribution factors of FTS programs tend to focus on the local food procurement component, mostly through inquiries initiated by school food service professionals (Derwingson 2008; Schafft et al. 2010; Berkenkamp 2006; Ratcliffe and Smith 2007; Izumi et al. 2006). Although strong motivating factors can influence actors to overcome or overlook barriers, distribution factors can in turn condition motivations. For example, interest on the part of school food service professionals is often tempered by a lack of knowledge about not only FTS as a school-based initiative, but the pragmatic and distribution concerns associated with local food procurement and preparation, (Schafft et al. 2010). Our study aims to better understand the context of farmer participation in FTS in Vermont, and how farmer motivations are related to willingness to overcome distribution barriers.

Methods and measures

Conceptual model: farmer motivations and distribution practices

The existing scholarly literature on FTS indicates that farmer motivations are multi-faceted, involving a complex calculus of individual economic gain, long-term community benefit, and greater social good. This research project examines how such varied motivations translate into distribution to schools in Vermont. In order to do so, we theorize that variations in levels of commitment to these independent variables will influence the dependent variables, or distribution practices. We theorize that farmers can be classified as having primarily market versus social orientations, and that those typologies can explain willingness to engage in school markets. Specifically, those farmers who perceive economic or social benefit from sales to schools would be motivated to adopt distribution practices not commonly used in sales to other outlets (retail, direct to consumer, wholesaler or broker) in order to overcome the unique obstacles of FTS. Farmers who lack one or both types of motivations would be less willing to incur the extra (time, transportation, and investment) costs of FTS distribution.

Indicators of social benefit to be included in our model and subsequent empirical analysis include:

- Donation of food to schools: These are cases in which farmers are willing to provide some food products to their customers without directly receiving revenue in return.
- Offering lower prices for school food services relative to non-school institutional customers: Izumi et al. (2010b) describe instances of "creative purchasing" (p. 380) in which farmers and school food services formed special procurement relationships based on underlying social values that deviated from their normal institutional practices.
- Hosting of field trips or visits to classrooms: Hosting field trips or visiting classrooms would suggest a social motivation because these activities represent respondents' involvement with and concern for the educational aspects of FTS programs.
- Self-reported benefit(s) for the school, students, or community as a result of selling to school food services: Respondents' recognition of benefits to the school, students, or community was considered to indicate a social motivation. This variable is directly comparable to Izumi et al.'s general characterization of "generating social benefits" (2010b, p. 379).

In contrast, in our model, these variables would be indicative of a more market-based set of motivations:

- Self-reported market benefits for a farmer who is selling to school food services: Presence of this variable indicates farmers are market-motivated and is a general case of the "market diversification" motivation described by Izumi et al. (2010b, p. 378).
- Investment in capital goods as a result of selling to school food services: Capital investments associated with school food service sales suggest that a farm considers this to be a profitable market currently or in the future. These farmers are willing to accept a certain amount of risk, presumably expecting a payback in the form of increased sales.
- Perception of sales to school food services as increasing overall farm profitability: The profit motive is central to rational economic actors' decision-making framework. Respondents who reported that sales to school food services increased the overall profitability of their farms were considered to exhibit a market-based motivation.
- Total sales to and percentage of total yearly sales accounted for by sales to school food services:

Respondents with school food service sales accounting for higher percentages of their total yearly sales were considered to have a more market-based motivation with respect to their school food service accounts since this indicates that school food service sales were likely a more significant part of their overall income. Several studies have used this measure to evaluate the significance of FTS sales to farmers (Allen and Guthman 2006; Joshi et al. 2008; National Farm to School Network et al. 2009).

- Preferred change in sales during the current school year relative to the previous school year: Respondents who preferred their sales to increase over the previous year's levels were considered to have a market-based motivation because they likely either considered their current level of sales too small to be gainful, or saw the school food service market as one in which they could gain more by selling at higher volumes. These respondents appear similar to the farmers whom Izumi et al. (2010b) described as expecting to gain economically from FTS sales in the future.

Several additional variables were then selected that indicated an array of distribution practices pertaining to farmers' sales to school food services. For the purposes of the present study, distribution variables are understood to describe practices or conditions that affect or define how farmers carry out their sales to school food services. Of particular interest are practices that depart from farmers' current or preferred practices. Examples include a farmer's:

- Willingness to enter into forward contracts with schools to facilitate advance menu planning (again incurring transaction costs of negotiation)
- Willingness to increase frequency of ordering (and concomitant increased transaction costs)
- Willingness to increase frequency of delivery (incurring increased labor and costs and increased wear on vehicles)

Finally, one variable measures farmers' unwillingness to diverge from current practices: requiring schools to pick up produce from the farm rather than farmers' delivering it to schools (and saving costs associated with delivery discussed above).

We theorize that those farmers with stronger economic motivations may be more willing to incur transaction costs, such as more frequent ordering and contract negotiation, in order to earn revenue from sales to schools. Similarly, we theorize socially motivated farmers would be more likely to incur delivery costs in order to have greater opportunity for interaction with students, food service professionals, and other school community members.

Survey design and administration

The authors of this article partnered with the Vermont Agency of Agriculture, Food and Markets (VAAFM) and Vermont Food Education Every Day (VT FEED) to develop the survey instrument. VAAFM initially solicited the survey partnership to inform and support its Rozo McLaughlin Farm-to-School Grant Program. Question content was determined by emerging issues from the literature, discussions with key informants and the priorities of VAAFM and VT FEED, based on their experiences in the field. Questions focused on the aforementioned indicators of social and economic motivations, and distribution practices. All protocols were approved by the University's Institutional Review Board.

The partners compiled a sample frame of 198 Vermont farms associated with schools for which at least one form of contact information was available (postal address, email address, or telephone). Farm and farmer names were drawn from documents and lists provided by VAAFM and leading organizations active in the state's FTS movement, including a survey in which Vermont school food service directors listed local producers from whom they bought food (VT FEED 2004). These lists were carefully selected by the partner organizations to maximize the likelihood that prospective respondents were already in some way involved with FTS programs.

Such purposively assembled lists are valid sample frames of rare populations when the costs of screening out large numbers of ineligible respondents are prohibitively high, although statistically not generalizable (Weisberg 2005). The high transaction costs of direct farm sales to school food services (Strohbehn and Gregoire 2001), together with the relatively small ratio of school food services to farms in Vermont (approximately 200–6,984, according to VT FEED 2011 and USDA NASS 2007), justify the classification of farms that sell to schools as such a rare population. While the sample frame did not necessarily include all Vermont farms that sell to school food services, this particular purposive sampling method maximizes the frame's coverage as much as is practical, given the statewide reach of VT FEED's and VAAFM's FTS programming. These organizations play an integral and wide-reaching role in linking farms with schools.

The survey consisted of two separate questionnaires: one for farmers who had sold to Vermont K-12 school food services between July 1, 2008 and June 30, 2009 (Track A), and another for farmers who had not (Track B). Respondents were filtered into one questionnaire or the other by the first question in the survey: "Did your farm sell to school food services during the previous school year" (between July 1, 2008 and June 30, 2009). The following results reflect only the responses of those farmers in Track

A. Subsequent questions measured the indicator variables for social and economic motivations and willingness to utilize school-friendly distribution practices.

Data collection

The survey was made available online through the SurveyMonkey collection tool. Hard-copy letters introducing the survey and asking for participation were sent to the proprietors or managers of all farms in the sample frame for which mailing addresses were available (195 farms). An email version of the letter was also sent to farms for which email addresses were available (139 farms). The hard-copy and email letters included a link to the online survey. Farmers who did not respond online within approximately 2 weeks were telephoned (phone numbers were available for 196 farms); if they were willing to participate over the phone, surveyors administered the questionnaire verbally and entered data into the SurveyMonkey collection tool. Non-respondents were contacted by telephone three times before collection efforts were discontinued. Copies of the survey instrument are available upon request from the corresponding author.

Mixed-mode data collection is a cost-effective way of maximizing survey response rates by taking into account respondents' preferences for, or access to, various means of communication (Saris and Gallhofer 2007; Weisberg 2005). It is important to acknowledge the possibility of mode effects or interviewer bias on the results, especially since some respondents self-administered the survey while others were interviewed (Alreck and Settle 2004; Saris and Gallhofer 2007). Using the same questionnaire in the telephone contacts as in the self- administered, online contacts minimized mode effects.

One hundred and thirty-three responses were collected between October 9 and December 4, 2009, either online or over the phone, for a response rate of 67%. Of these respondents approximately 50% (67), had sold to school food services at least once during the previous school year and thus completed Track A. Because recent sales suggest active involvement in FTS programs, this half of the respondents was of interest for the analysis discussed in this article. Data were downloaded from SurveyMonkey, partially coded in Microsoft Excel software, and transferred to Statistical Package for the Social Sciences software (SPSS version 18.0).

Data analysis

In order to identify the extent to which farmers fall into typologies of social and economic motivations, the motivation indicator variables representing farmers' motivations were analyzed using a two-step cluster algorithm in SPSS version 18.0. This exploratory analytical method evaluates a set of cases (farmer respondents in this study) for similarity in their profiles on a set of theoretically relevant variables that are independent from one another. It uses a log-likelihood distance measure in order to include both categorical and continuous variables in its calculation of similarity and determines an optimal number of clusters containing similar cases, based on this distance measure.

The two-step cluster procedure uses the Bayesian Information Criterion and an agglomerative, hierarchical clustering method to sort cases into each cluster (IBM SPSS 2009). The researcher then subjectively interprets types from the cluster results, drawing upon the theoretical orientation that he or she used to select the variables (Lorr 1983). This technique is useful for finding patterns of similarity—underlying groups—within sets of data (Manly 2005). In our study, cluster analysis was chosen to answer the research question regarding the extent to which farmers' motivations to participate in FTS can be classified into social and economic typologies. Given the exploratory nature of the study and complexity of farmer motivations, it is an effective method to discover whether patterns of motivations emerge within our sample.

The two-step cluster analysis yielded three distinct clusters of similar cases presented and discussed in the results section below. A variable was assigned to respondents indicating membership in their respective clusters. These cluster membership variables were cross-tabulated with distribution variables. To measure the extent to which members of the respective clusters differed in their willingness to adopt distribution practices, a Chi Square test was conducted for each of the binary distribution variables, to determine if groups were statistically significantly different in their willingness to adopt these practices.

Results

Motivation

The underlying groups defined by the clustering algorithm are represented in Table 1, with names assigned to them according to an interpretation of their variable profile based on our conceptual model. Cluster 1 had the highest percentages of respondents who donated to schools and who hosted field trips or visited classrooms, far greater than those in Clusters 2 or 3. Cluster 1 also had the greatest percentage of respondents who wanted their sales to school food services to increase during the current school year, a variable that was theorized to indicate a market-based motivation. This is another occurrence that indicates the possibility of hybrid motivations in farmers' sales to school food services. Finally, Cluster 1 was distinguished by its

Table 1 A typology of farmers' motivations in sales to school food services: descriptive statistics for indicator variables for each farmer cluster

Variable	Type of motivation indicated by variable	Cluster 1: socially motivated (n = 25)	Cluster 2: low engagement (n = 22)	Cluster 3: market-motivated (n = 14)	Significance
Donate	Social	**Yes: 92%**	Yes: 27%	Yes: 79%	$X^2 = 23.08^*$
School price versus institution price	Social	40% do not sell to other institutions	91% do not sell to other institutions	**School and institution prices same: 50%**	$X^2 = 17.16^*$
Field trip or class visit	Social	**Yes: 92%**	Yes: 55%	Yes: 50%	$X^2 = 10.67^*$
School or community benefit	Social	Yes:76%[a]	Yes: 77%	**Yes: 100%**[a]	$X^2 = 4.01$
Farm benefit	Market	Yes: 0%	**Yes: 55%**[a]	**Yes: 57%**	$X^2 = 20.69^*$
Capital investment	Market	Yes: 4%	Yes: 0%	**Yes: 43%**	$X^2 = 17.80^*$
Effect on profit	Market	None: 64%	None: 64%	**Increase: 86%**	$X^2 = 24.48^*$
$/school food service account	Market	$286	$270	**$1,591**	$F = 24.37^*$
School % of total farm sales	Market	4%	1%	**21%**	$F = 5.93^*$
Preferred change in sales	Market	**Increase: 88%**[a]	Increase: 50%	Increase: 64%[a]	$X^2 = 23.97^*$

Bolded responses indicate the highest percentage of responses (i.e., strongest engagement) across clusters

* Significant at 1% or better

[a] Result deviating from the overall tendency of a cluster

respondents' lack of market motivation on several market variables. None reported a benefit for their own farms as a primary benefit of sales to school food services; very few reported making capital investments as a result of sales to school food services; and sales to school food services made up on average a small percentage of these respondents' total sales. Due to greater emphasis on social than on economic motivations, this group was named the "socially motivated" group.

Cluster 2 was distinguished by low values of both market-based and social motivation variables. Respondents in this cluster sold on average the smallest value of products to school food services out of all three clusters. Paradoxically, while the percentage of respondents in this cluster who reported that their own farms benefited from sales to school food services was almost as great as that in Cluster 3, most respondents in Cluster 2 reported that these sales had no effect on the overall profitability of their farms. This may be due to the fact that sales to school food services accounted for the smallest average percentage of overall sales for respondents in this cluster. These respondents had the lowest average rate of donating to schools (27%). Only slightly more than half (55%) reported hosting field trips or visiting classrooms, and 77% reported a benefit to schools, students, or the community. These farmers do not see great economic benefits in these sales, and are less willing to support FTS programs with investments of time or other resources. Based on these attributes, Cluster 2 was named the "low engagement" group.

Cluster 3 appears to be the group of farmers with the strongest overall market motivation for selling to school food services. This cluster exhibits the greatest number of variable values theorized to indicate a market-based motivation. Compared to the other clusters, respondents in Cluster 3 sold a much greater value of food per school food service account than those in the other two clusters, had the greatest percentage of respondents who reported a benefit for their own farms, invested in capital, and reported an increase in farm profitability. For these reasons, Cluster 3 was named "market-motivated." Interestingly, this cluster did not have the greatest percentage of respondents who preferred an increase in their sales to school food services; this was the only variable theorized to represent a market motivation that did not exhibit its strongest value in Cluster 3. All of the respondents in this cluster reported a benefit to the school, students, or the community as a primary benefit of sales to school food services; this variable was theorized to represent a social motivation. The fact that it was most thoroughly represented in Cluster 3 (though not significantly more than in the other two clusters) is a clear indication that farmers who are most notable for their strong market-based motivations can also exhibit social motivations in their sales to school food services.

Distribution practices

This section presents results of a cross-tabulation between cluster membership and variables that measure farmers' willingness to adopt distribution practices. As seen in Table 2, farmers in the market-motivated group (Cluster 3) were most flexible in their willingness to incur costs to gain FTS revenue: large percentages of these farmers are willing to accept frequent orders and deliveries (79 and 92% respectively) and half (50%) are willing to enter contracts, a number much higher than the other groups.

Farmers in the low engagement group (Cluster 2) display passivity in these markets; for example, 52% of these farmers require schools to pick up produce on-farm, placing these costs on schools as a requirement of doing business. In contrast, only 7% of market-oriented farmers (Cluster 3) require on-farm pick-up. Similarly, only a minority of low engagement farmers are willing to enter contracts (14%), or have frequent orders (25%) or deliveries (36%), further suggesting unwillingness to adapt to serve this market.

Socially motivated farmers (Cluster 1) comprise an in-between case: more willing to adapt than low engagement farmers (Cluster 2) but less than market-oriented farmers. The majority of these farmers are willing to deal with frequent orders (64%) and deliveries (60%), but few (14%) are willing to use contracts.

Table 2 Relationship between farmers' motivation to participate in FTS (by cluster) and distribution practices

Distribution variable	Percent of farmers			Significance
	Socially motivated (Cluster 1)	Low engagement (Cluster 2)	Market-motivated (Cluster 3)	
Willing to use growing contract (n = 61)	16	14	50	$X^2 = 7.55^*$
Willing to order 2x/month or more (n = 56)	64	25	79	$X = 10.98^*$
Willing to deliver 2x/month (n = 52)	60	36	92	$X^2 = 10.98^*$
Require on-farm pick-up (n = 58)	44	52	7	$X^2 = 7.80^*$

* Significant at 1% or better

The market-motivated cluster had a significantly greater percentage of respondents who entered into growing contracts with their school food service customers (Table 2). Such contracts entail advance planning on the parts of farmers and institutional customers and incur transaction costs but lead to more predictable revenue to farmers and costs to food services. While school food services may not necessarily be required to purchase the amount stipulated in the contract (some respondents reported their growing contracts to be informal agreements), a prior agreement appears to aid farmers in making distribution decisions such as how many seeds to plant, how much acreage to allot, and at what times labor will be required for harvesting and delivery. For school food service customers, planning supply in advance aids menu planning and budgeting and may yield a more favorable price in exchange for agreeing to purchase a given amount. These factors together may result in a steadier procurement relationship conducive to higher, more predictable volumes of food than would procurement on a more ad hoc basis.

Discussion

This study describes the factors that motivate Vermont farmers' direct sales to school food services and considers these farmers as economic actors for whom distribution and financial considerations are important mediators of FTS participation. Our analysis finds farmer clusters based largely on economic versus social motivations; however, an array of both social and economic motivations underpin participation in FTS, confirming the complexity of motivations and hybridity of distinctions found in prior studies of local food markets (Hinrichs 2000; Izumi et al. 2010b). Survey results find that a mix of economic and social motivations informs farmer participation in these markets. Further, these results present a relationship between motivation type (economic or social) and distribution practices. Farmers with stronger economic motivations are somewhat more willing to adopt distribution practices to meet buyer needs, such as forward contracts, and increased ordering and delivery frequencies. Farmers showing little economic or social motivation exhibit little willingness to adapt their distribution practices to meet school needs, while socially motivated farmers are more willing than the low engagement group but less willing than market oriented farmers. Perhaps the most notable result is the primacy of economic motivations: market-oriented farmers are, across the board, more willing to invest and incur increased transaction and other distribution costs to meet FTS needs, a result not predicted by our conceptual model.

If a farmer considers schools as customers, then the farmer is more likely to be willing to make changes to meet

customer requirements. Conversely, farmers who consider schools as charities receiving favors are less likely to adapt. Furthermore, if market-oriented farmers are more flexible in meeting buyer needs, then efforts to identify market-oriented farmers or improve incentives can aid in scaling up purchasing in FTS programs.

Interpretation of the three cluster results confirms the usefulness of the continuum of market-based and socially based motivations used in previous studies of local food markets (Hinrichs 2000; Izumi et al. 2010b) as a tool to understand the factors that motivate farmers' direct sales to school food services. The analysis further suggests that farmers' economic gain from sales to school food services does not preclude their valuation of social benefits resulting from these sales. Indeed, faced with prospective economic benefits from engaging with schools, farmers for whom school food services are viable markets may indeed be all the more motivated to support the nutrition and education of students consuming their products. Our results build on those of Hinrichs' (2000) study of direct markets and Izumi et al.'s (2010b) research on farmers engaged in FTS. A complex interplay of social and economic motives underpins farmer participation in these markets, further suggesting the hybrid nature of alternative food systems and fluid boundaries between social embeddedness and traditional economic motives. Our results suggest greater importance of economic motives than was found earlier or predicted by our model.

These results can also guide expanding nationwide efforts to provide technical assistance to FTS programs (such as the United States Department of Agriculture's FTS tactical teams or pending legislation that would establish a federal-level competitive FTS grant program). These questions may be used as indicators for participation and to guide effective technical assistance efforts. While both social and economic motivations underpin participation, our results suggest that farmers with stronger economic motivations are most likely to adopt distribution practices preferred or required by schools, followed by socially motivated and low engagement farmers. The market-oriented farmers comprise, in a sense, the low-hanging fruit for technical assistance efforts: ready and willing to engage in school markets. Socially motivated farmers will require more technical assistance to meet the economic realities of school markets while building on these farmers' community ties.

The low engagement cluster cannot be understood as either strongly market-motivated or strongly socially motivated. The absence of a theoretically distinguishing characteristic for these farmers suggests a designation in the negative: they do not appear to be highly engaged in either aspect of FTS programs. Their lack of engagement and unwillingness to adopt distribution practices favorable to farms suggests these farms may not be the best targets for FTS technical assistance.

However, it is also valuable to identify farmers who are most willing and able to engage most comprehensively in FTS programs. This study suggests that socially motivated farmers may also stand to benefit greatly from technical assistance, as many of them hope to increase their sales to school food services but lack some of the distribution practices necessary to do so. These farmers may best be connected to schools through assistance efforts that would create cooperative (perhaps non-profit) arrangements for ordering, aggregation, and other services. Such arrangements would potentially decrease individual farmers' transaction costs while maintaining social connections that foster experiential opportunities for students. Almost all of these socially motivated farmers hosted field trips or visited classrooms as part of their FTS partnerships, indicating that if they had better access to technical assistance allowing them to scale up their sales to school food service operations, they would be better able to integrate the procurement and education components of FTS programs. Because these components can be mutually supportive, technical assistance for socially motivated farmers could be an efficient allocation of scare FTS funding resources. Finally, given the importance of social embeddedness in FTS efforts, technical assistance may be expanded to include social networking and social media, social policy, and community building through food networks.

For both market- and socially motivated farmers, growing contracts with school food services may be an especially important distribution practice to encourage through technical assistance. In this study the market-motivated farmers who engaged most frequently in these agreements are associated with higher-volume, more frequent sales, and higher rates of profitability from FTS sales. The literature also suggests that school food services prefer vendors who offer a predictable supply (Berkenkamp 2006). Growing contracts could thus be instrumental in increasing the contribution of FTS sales to the overall income of participating farmers. Efforts to research and create a menu of contracting options more acceptable to farmers may help achieve this end.

Conclusions

This study investigates farmer motivations and distribution practices for FTS programs, finding that a complex array of motivations underpin participation, as found in prior studies. Specifically, the farmers in this study fit into three broad typologies based on their motivations for participation in school markets. We find that farmers with market-based motivations are most willing to adopt distribution

practices needed to serve school markets, while farmers with social motivations are somewhat less willing. Farmers who show little market or social motivation are by far the least willing to engage in these markets. We suggest that understanding farmer motivations can help to effectively allocate technical assistance resources. Market-oriented farmers are most ready to engage, while socially motivated farmers would benefit from assistance that builds on their social ties to schools while helping to mitigate transaction costs. Low engagement farmers would be a low priority for scarce technical assistance resources.

While the results suggest implications for understanding agri-food studies and guidance for technical assistance efforts, they are limited to a single non-representative sample in a single state; generalization to other farmer populations is inadvisable. The exploratory nature of the research situates this study to inform future investigations into the interaction between farmers' motivations and distribution concerns in FTS programs. The conceptual model and results were developed within a limited context and replication for other samples of farmers in other locations would greatly increase the validity of contributions to theory and practice.

A clearer distinction between farmers' motivations and distribution concerns in future research will help FTS practitioners better determine when particular local food procurement strategies are most appropriate. This distinction could be crucial to ensure that, as Schafft et al. (2010) emphasize, FTS programs cater to the unique qualities and needs of their local communities. We hope that our study begins to inform efforts to involve farmers in FTS programs and better allocate technical assistance resources, so that even more students, farmers, and communities may learn and prosper from these unique and valuable partnerships.

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