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# **Rural Wealth Creation Impacts of Urban-based Local Food System Initiatives: A Delphi Method Examination of the Impacts on Intellectual Capital**

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# **Rural Wealth Creation Impacts of Urban-based Local Food System Initiatives: A Delphi Method Examination of the Impacts on Intellectual Capital**

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## **Abstract**

There is growing interest in understanding alternative forms of wealth creation in rural areas from emerging food system initiatives. Developing an appropriate framework for assessing the changes in the stocks of wealth is necessary to provide a comprehensive lens when evaluating community development outcomes, but is challenged by definitional, data, and comparative limitations. Using a case study of the Greenmarkets in New York City, this paper describes a Delphi Method approach to identify prioritized impacts and indicators measuring changes in rural wealth from farmer participation in urban-based local food markets, and provides a preliminary empirical assessment of these impacts in the construct of intellectual capital using data collected from farmers and customers. We find that sufficient engagement between farmers and urban consumers, along with educational programming provided by the urban local food initiative, lead to improved entrepreneurial capacity of participating farmers and promote the diversity of and increased knowledge of farming/agricultural issues by urban consumers. However, limited technical and/or infrastructural resources in rural areas and/or urban local food market rules may limit gains in stock of rural intellectual capital.

**Key words:** Delphi Method, intellectual capital, local food, rural wealth creation, rural-urban linkages

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# **Rural Wealth Creation Impacts of Urban-based Local Food System Initiatives: A Delphi Method Examination of the Impacts on Intellectual Capital**

## **Introduction**

In a number of dimensions, rural people and places in the United States (US) have, on average, fared worse than their urban counterparts. For example, rural areas continue to experience higher poverty rates and lower educational attainment than urban areas. Further, for the first time in US history, rural areas have witnessed declining populations (since 2010), while urban populations continue to grow (Kusmin 2015). At the community level, this may result in a lower demand for jobs, decreases in workforce quality, and increases in the per capita costs of providing public services (Jablonski 2014).

In search of new opportunities to support rural communities and economies, federal and state agencies, private foundations, and development organizations have set a new priority for rural America: strengthening local and regional food systems. Local and regional food systems, for example, are one of the US Department of Agriculture's (USDA) four pillars of agriculture and rural economic development (USDA 2015). Between 2009 and 2015, the USDA invested over \$1 billion in more than 40,000 local and regional food systems projects (Vilsack 2016).

Understanding the impacts of these types of investments is still nascent and relatively limited in focus. However, more concerted efforts have been initiated in recent years, particularly to measure the impacts on job creation, output (commonly sales), or value added measures (e.g., labor income). In 2013, the Union of Concerned Scientists and Michigan State University's Center for Regional Food Systems convened a meeting of local food economists and researchers to identify data needs and best practice methodologies to better understand the impact of local food system activity (O'Hara and Pirog 2013). Subsequently, the USDA's Agricultural Marketing Service assembled a group of academic researchers and local food system experts to develop a community toolkit on best practices for conducting economic impact assessments (Thilmany McFadden et al. 2016) that includes summaries of a number of published case studies promoted as best practice approaches (e.g., Gunter and Thilmany 2012; Hughes and Isengildina-Massa 2015; Hughes et al. 2008; Jablonski et al. 2016; Schmit et al. 2016; Swenson 2010). Collectively, these impact studies tend to show relatively small, albeit positive, short-term gains accruing to local economies.

Other approaches to examine the economic effects of local food systems activity have utilized spatial panel data econometric approaches (e.g., Deller 2014; Brown et al. 2014), whereby a measure of local foods activity (typically direct-to-consumer farm sales) is used as an explanatory variable in describing changes on income growth (typically county-level per capita income). Here, the impacts of local food systems activity have been shown to be either relatively small (but commonly positive) or not statistically different from zero. However, the authors recognize data limitations in their approaches and/or the restriction of impact on a relatively narrow (financial) measure.

A more comprehensive evaluation of the broader community impacts of local foods activities is needed to inform the efficacy of development efforts and to better guide policy. While short-term economic impact assessments consider changes in the stocks of various types of market-valued capitals, they do not endogenously account for contributions to productivity that capital

investment typically involves. Expenditures on education, information, intellectual assets, and social relationships, for example, are either excluded or treated as consumption or as intermediate goods rather than investments (Johnson et al. 2014). To this end, the USDA has begun to actively promote (and fund) projects that consider a more encompassing measure of rural development focused on the concept of *rural wealth creation* that considers an array of community wealth or capitals (Pender et al. 2012a, 2012b). In this context, the concept of “wealth” includes all types of community capital assets (net of liabilities) that contribute to the well-being of people and communities, and are commonly categorized as social, cultural, individual, intellectual, political, physical, natural, and financial capitals (Carolan and Hale 2016; Pender et al 2015). Changes in wealth can paint a very different picture than changes in traditional measures of economic activity when it comes to evaluating outcomes and policy practices.<sup>1</sup>

Most attempts at measuring the impacts of non-market valued capital assets have focused on a specific capital and its relationship to rural economic development (e.g., Goetz and Rupasingha 2006; Putnam 2007; Rupasingha et al. 2006). There has been much less attention on investments in multiple types of assets and their interactions, and how these concepts should be measured (Pender et al. 2012b). While promising, the application of the rural wealth creation approach to the evaluation of local food systems activities is considerably limited. Indeed, only Jablonski (2014) provides the first peer-reviewed discussion of this approach to a type of local food system initiative (i.e., farmers markets). Through a comprehensive literature review, they postulate that measuring impacts *vis a vis* rural wealth creation can elicit very different results, and thus policy implications, than more traditional economic impact assessments.

Furthermore, Pender et al (2012b) emphasize that the metrics to use in representing the various capitals remain uncertain and are likely unavailable from traditional secondary sources. Johnson et al. (2014) promote a methodological application to this approach utilizing an extended social accounting matrix (SAM) model that incorporates non-market valued capital assets. While they suggest a few capital indicators with which one could populate their framework, they note “data and measurement issues are as challenging as ever” (p.52). Brown and Lewin (2015) and Pender (2015) identify proxy variables for various capital measures to look at their association with per capita incomes and land values, respectively, albeit selected on a relatively ad hoc basis. The challenge in deriving empirically tractable metrics is in how best to identify and prioritize impacts that ‘move the needle’ and then associate them with measurable indicators. The level of complexity grows when considering how the indicators compare and interact with one another and with more traditional economic impact measures.

The contributions of this paper are three-fold. First, we consider a rural wealth creation framework to begin to assess the *rural* impacts from farmer participation in *urban*-based local food markets. The distinction of rural and urban should not be overlooked. Traditional local food impact assessments consider a single, self-contained geographic area (e.g., a single state, county, or multi-county region). However, we know that local food system initiatives are concentrated in urban areas and purported to promote farm profitability and rural economic development (Low et

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<sup>1</sup> To illustrate, Pender et al. (2014) describe the events following Hurricane Andrew, where twenty-six people died and more than \$26 billion in property damages resulted in South Florida. They note this type of disaster may generate significant economic activity in the short-run, but few would argue that the overall wellbeing of community members was improved.

al. 2015). Accordingly, one must consider not only the forms of community capital changes, but how these changes are linked between rural and urban places. Given the vastness of eight forms of community wealth, and the potential linkages between them, this paper will concentrate on the identification of one form of community capital that is generally agreed to be important in assessments of local foods development: intellectual capital. Intellectual capital represents the stock of knowledge, innovation, and creativity or imagination in a region (WealthWorks n.d.). We utilize a case study of GrowNYC's Greenmarkets in New York City (NYC), the largest network of outdoor farmers' markets in the US, to further define our population and the rural and urban regions of interest.

To address the capital prioritization, measurement, and data issues, our second contribution addresses these issues by utilizing the Delphi Method (DM) to take advantage of the intellectual resources in both academic/research and extension/outreach communities in our study area and to guide future research directions. Drawing on two panels of experts we identify the most likely types of capital effects in rural communities, and the measurement of them, from an urban-based local food system initiative. Doing so provides a clear trajectory for future research and improves efficiency of subsequent data collection efforts.

Our third contribution is empirical, namely, utilizing the results of the DM application, we collect and analyze primary data from two important audiences – farmer vendors participating in the Greenmarkets and customers who shop at them. By descriptively summarizing the data, with our focus on intellectual capital, we are able to provide preliminary evidence of the wealth creation impacts associated with intellectual capital in the adjoining rural areas from participation in the Greenmarkets (urban) program. Furthermore, we highlight the process of transmission (or impact pathways) for intellectual capital that lead to these impacts, as developed through the DM.

The paper continues with a description of the DM and its application to our case study. A discussion of the results from the DM application in the case of intellectual capital follows, including comparisons of the results derived from the separate research and extension expert panels. We then present some preliminary results based on data collected from Greenmarket farmer vendors and market customers on the ways in which the stock intellectual capital is affected in rural areas. We conclude with our next steps in evaluating other prioritized capitals, along with directions for future research that consider the linkages between different forms of capital and reflective of both potentially positive and negative impacts on these capitals in rural areas.

## **Methodology**

Our methodology includes two distinct components. First, we utilize DM to identify and prioritize the types of community capital impacts in rural communities from our urban-based local foods system initiative (i.e., Greenmarkets), as well as to identify appropriate indicators (measurable variables). Second, based on the results of the DM application, we survey farm vendors and customers at the urban-based markets about the indicators to measure these changes empirically.

### *Delphi Method Application (DM)*

DM is a popular, qualitative forecasting technique that has been extensively applied across a wide variety of disciplines since it was conceived in the early 1950s at the Rand Corporation (Gupta and Clarke 1996). The notion behind DM is that the aggregate of a group will provide a forecast that is generally superior to that of most of the individuals within the group; judgement information is deemed indispensable. DM is largely employed to problems “where no historical data exist, or when such data are inappropriate” (Rowe et al. 1991, p .236). Rowe et al. (1991) outline four key components involved in this method:

1. Anonymity: achieved through the use of questionnaires;
2. Iteration: presenting questions over a number of rounds, allowing members to change their opinions;
3. Controlled feedback: sharing of group-member ideas through a formal input process;
4. Statistical group response: obtained at the end of the procedure where group judgement is expressed as a median or consensus.

DM has been applied to various aspects of food systems research, including: defining food literacy (Vidgen and Gallegos 2014), strategic planning of agriculture (Rikkonen et al. 2006), market development for organic products (Padel and Midmore 2005), identifying emerging food risks (Wentholt et al. 2010), developing food supply chains (Ilbery et al. 2004), and assessing market access and competitiveness issues (Henchion and McIntyre 2005). The use of this technique to forecast the impacts of urban-local food initiatives on rural community economic development has not been conducted.

Our project included assembling two distinct panels of experts. The first, the research advisory team, consisted of sixteen inter-disciplinary researchers (not including the project team) from universities across the Northeastern US. A wide array of disciplines were represented, including natural resources, veterinary medicine, planning, education, forestry, development/rural sociology, sociology, agricultural/applied economics, geography, human ecology, and food studies. Not all research advisory team members had expertise in food systems research per se, but all conducted research focused on rural communities or economies that considered one or more of the eight community capitals.

The second team, the extension advisory team, consisted of twenty-five stakeholders involved in the Northeast US food system, including government officials, planners, food distributors and processors, farmers market managers, agriculture lenders, nonprofits, and other funding organizations.<sup>2</sup> Farmers were explicitly excluded from the extension advisory team as subsequent components the research project included data collection efforts with this group of stakeholders.

The DM was utilized within the constructs of a case study focused on the rural impacts of farmer participation in GrowNYC’s Greenmarkets program.<sup>3</sup> Greenmarkets is the largest and most

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<sup>2</sup> A complete list of the organizational affiliations of the research and extension advisory team members is available upon request.

<sup>3</sup> GrowNYC was created in 1970 as the Council on the Environment of New York City. Originally a policy-based organization focused on quality of life issues like air quality, traffic, and noise, it established the city’s first farmers



diverse outdoor urban farmers market network in the US. It operates 54 markets in all five boroughs of NYC (Figure 1), and includes 240 participating farms and fishermen, from 6 Northeast states (NY, NJ, PA, CT, VT, MA), farming over 30,000 acres (Figure 2). A case study approach was deemed most useful at this stage given the paucity of available secondary data and, thus, the need for primary data collection and analysis.

[Figures 1 and 2 here]

Two research advisory team meetings were convened in 2015. The first meeting, in March, was held in Ithaca, NY on the Cornell University campus, and lasted two days.<sup>4</sup> The second meeting, in September, was a one-day meeting held in NYC so that research advisory team members could tour a Greenmarket and have the opportunity to engage with the Greenmarket Executive Director. Before the first research advisory team meeting, participants were asked to fill out a questionnaire with their preliminary thoughts about the ways in which urban-based local food system initiatives might impact each of the eight forms of community wealth, along with the level of impact likely to occur (i.e., high, medium, low). At this point, participants were asked to focus on the ways in which local food system initiatives might impact each of the eight forms of wealth.<sup>5</sup> They were not specifically asked about rural impacts or to focus on the impacts of the Greenmarkets program.<sup>6</sup>

At the first meeting, the research advisory team was introduced to the research and the rural wealth creation framework. Next, a group discussion was held to brainstorm the potential impacts by form of wealth, including potential indicators. Once a comprehensive list was determined, the team was split into four small groups to conduct more comprehensive discussions on two of the eight forms of wealth. The full team was then reconvened and presentations from each sub-group were given and discussed by the whole team. By the end of the meeting the group had a list of most likely rural impacts (positive or negative) by each form of wealth, and potential indicators that could be used to assess those impacts. Additionally, the team began to construct pathways to represent how the transmission of impact to rural communities would occur.

At the second research advisory team meeting, the results of the previous meeting were presented for review and discussion, including the initial impact pathways. The Executive Director of Greenmarkets then presented a description of the history and activities of the Greenmarkets program. Discussion during and following his presentation was encouraged. After the Director left, the research advisory team split into sub-groups to comprehensively review and revise the impact pathways for two of the eight capitals. As per DM, the sub-groups reported

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market in several decades, the Greenmarket in 1976. Today, GrowNYC oversees many programs of which the Greenmarkets program is one.

<sup>4</sup> All advisory team meetings (Research and Extension Advisory Teams) were facilitated by Shanna Ratner from Yellow Wood Associates. Yellow Wood has been a thought leader in developing the wealth creation framework, including managing the transition of the Ford Foundation's Rural Livelihoods Program to promote this type of approach.

<sup>5</sup> The research advisory team was provided definitions of the eight forms of wealth, written by Yellow Wood Associates to aid them in forming their initial (individual) responses.

<sup>6</sup> The level of familiarity and knowledge of the Greenmarkets program varied considerably among the research advisory team members, but all were at least aware of the program based on the preliminary information provided to them in our initial letter of invitation to participate in the team.

back to the full team who were then provided the opportunity to iterate and revise the pathways further before arriving at a final group response. The meeting concluded with a tour at one of the Greenmarket farmers markets by staff of GrowNYC.

The extension advisory team meeting was conducted as a ‘check’ on the research advisory team results and to further clarify and define appropriate indicators for subsequent data collection. The extension advisory team meeting was held in November 2015 as a pre-conference to the Northeast Sustainable Agriculture Working Group meeting in Saratoga Springs, NY. Given their familiarity of the Greenmarkets program, extension advisory team members were asked to come to the workshop prepared to share three concrete examples of how participation by farmers in the Greenmarkets program impacted farmers and rural communities, either positively or negatively.<sup>7</sup> As with the research advisory team, the extension advisory team members were provided definitions of the eight forms of wealth written by Yellow Wood Associates to aid them in forming their initial (individual) responses.

During the meeting, the team shared their examples before they were introduced to the wealth creation framework. Members of the team were told that the research advisory team had previously met, but they were not provided with any details regarding their discussions or findings. The Executive Director of Greenmarkets then presented a description of the activities and history of the Greenmarkets program. Discussion during and following his presentation was encouraged. After a presentation and team discussion about the rural wealth creation approach, the individual example impacts originally presented by the team members were grouped according to their affiliation with one (or more) of the eight capitals. Four sub-groups were then formed to clarify and prioritize the individual impacts. The sub-group results were then presented to the full team and discussed and modified by the entire group.

### *Primary Data Collection*

Since much of the advisory team discussions on intellectual capital impacts centered on interactions occurring at the urban markets, insights of these activities were formally gathered from both farmer vendors and Greenmarket customers. Using the prioritized impacts and indicators coming from the advisory teams (discussed below) survey questions were developed for both constituents. In addition to questions surrounding community capital impacts, detailed financial data (e.g., production expenses, sales by market channel) was collected from farmer vendors. Accordingly, these data were collected via in-person interviews using Qualtrics on- and off-line platforms. Interviews lasted approximately 1.5 to 2.0 hours.

Survey questions for Greenmarket customers were administered using Rapid Market Assessments (RMA). Also known as dot poster surveys, RMAs gather information from farmers market patrons in a quick, but informative process (Lev, Brewer and Stephenson 2008). The technique has many advantages, including simple administration, easy tallying of responses, and the ability to get a large number of responses in a relatively short period of time (particularly at large urban farmers markets). Customer respondents also report that the method is faster to complete, more fun, and less intrusive than written surveys or face-to-face interviews. Drawbacks, however, include questions that must be limited in number and scope, and the

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<sup>7</sup> Some extension advisory team members were quite familiar with the Greenmarkets program, while others knew much less. All were at least aware of the program based on the preliminary information provided to them in our initial letter of invitation to participate in the team.

inability to correlate individual's responses across questions. Additionally, since all subsequent respondents see the answers of previous visitors, it may introduce bias (Thilmany McFadden et al. 2016). Refreshing the dot posters regularly should attenuate some of this bias.

## Results

Given the substantial and complex information generated as part of the advisory team meetings, we limit our discussion of DM results and primary data collected to those associated with impacts on intellectual capital.

### *Prioritized Impacts and Indicators*

The top three prioritized impacts from the advisory teams on the influences of intellectual capital in rural areas from farmer participation in Greenmarkets are included in Table 1. The impacts from each team were matched by project leaders based on their similar concentrations to three impacts on intellectual capital, namely, (1) education of consumers and farmers, (2) entrepreneurial innovations and idea sharing among farmers, and (3) value chain innovations and development in rural areas. While the general extension advisory team results were consistently positive in each of the three dimensions, which on net may certainly be true, the research advisory team results inform the reader that individual components within these areas of change may contribute either positively or negatively. Negative impacts consider the availability of sufficient infrastructural resources within rural communities to support product and value chain innovations, public education limitations (in both rural and urban areas), existing Greenmarket rules that may limit innovation (e.g., restrictions on sources of products or types of ingredients), and whether communication to farmworkers is conducted sufficiently to support farm-level changes.

[Table 1 here]

Once the impacts were prioritized, advisory team members provided proposed indicators so as to measure these impacts. The project team then combined similar indicators proposed by both teams to come up with the indicators shown in the last column of Table 1. Questions largely focused on the interactions between farmer vendors and customers at the Greenmarkets and how they influenced changes in urban perceptions and knowledge of agricultural and rural issues, farmer idea sharing (among and outside of Greenmarket vendors), and the process of new product development or linkages with other value chain intermediaries. An analysis of the specific questions answered by farmers and vendors is shown below.

### *Pathways of impact transmission*

As mentioned, the research advisory team spent much of their second meeting analyzing the pathways through which impacts were likely to occur. Pathways of impact were forecasted at the first advisory team meeting and then revised at the second team meeting. Figure 3 provides predicted pathways of impact for intellectual capital. Note that blue boxes represent prioritized impacts and yellow boxes represent places in which investment or changes in intellectual capital lead to changes in (i.e., interaction with) other capitals. Perhaps most importantly, this illustrates why research focused exclusively on one capital or impact is short-sighted. Using the example of intellectual capital, the research advisory team forecasted that ideas for the development of new products will lead to natural capital impacts, as farmers are likely to grow different crop varieties as well as to shift their production practices in response to consumer demand. As attention to

multiple capitals is necessary for a complete analysis, understanding and linking the pathways (and impacts) will be crucial.

[Figure 3 here]

### *Empirical Measurements of Impact*

Though the DM results provide important insight into forecasting how rural communities may be positively and negatively impacted by investment in urban-based local food system initiatives, empirical measurement of these impacts is necessary to inform development efforts. Below we describe the results of the data collected from Greenmarket farmer vendors and customers.

Farmer Vendors: In-depth interviews were conducted from July 2015 to April 2016 with 40 farms that sell product at one or more Greenmarket. Interview protocols were developed based in large part on the impacts and indicators forecasted by the advisory teams (Table 1). Specific questions to farmers related to intellectual capital included:

1. Has participation in Greenmarkets led to changes in your production practices, the number of products and varieties you grow, or production of processed (value added) products?
2. Has participation in Greenmarkets supported the development of new ideas for products and marketing techniques as a result of interacting with other vendors at the Greenmarket, by talking to a Greenmarket manager, or a via conversations with Greenmarket customers? Have you also implemented these ideas in your home (rural) markets you participate in?
3. Have you shared new ideas for products or marketing techniques learned from Greenmarket interactions with other farmers or individuals back in your home (rural) community?

The majority of farm respondents (>70%) reported that they got at least some new ideas from selling at a Greenmarket (Figure 4). Even more telling, 66% of farm respondents reported that they have already made changes to their farm business (ideas for a new product and/or marketing technique) based on these ideas, with an additional 9% intending to make changes in the near-term. Importantly, in terms of evaluating rural impacts, 45% of farms reported that they made these changes to product sold in both rural and urban markets. Almost 70% of respondents reported that they shared ideas that they got through Greenmarkets with farmers or other individuals in their home communities, with an additional 12% reporting that they intend to do so. Of the changes farms reported, Greenmarket's stimulation of both interest in and ability to produce value added products appears most prevalent. Almost two-thirds of farm respondents reported changes in value added product development as a result of GM participation (Figure 5).

[Figures 4 and 5 here]

Market Customers: Between September 19 and October 2<sup>nd</sup>, 2015, the project team collected data from 824 farmers market customers at eight Greenmarkets: Grand Army Plaza (twice), Union Square, Brooklyn Borough Hall, Poe Market, Jackson Heights (twice), and 97<sup>th</sup> Street. Greenmarket staff accompanied the research team, and provided a tent and easels. Questions

posed to customers were based on impacts and indicators prioritized by the advisory teams (Table 1). In particular, two questions addressed impacts on intellectual capital:

1. When shopping at a Greenmarket, I talk to farmers about:
  - a. What is happening on the farm
  - b. Policy issues (food, agricultural, rural)
  - c. Ideas for new products
2. Shopping at Greenmarket has influenced my perceptions about:
  - a. Farmers
  - b. Farms
  - c. Agriculture
  - d. Rural places

Both questions relate to knowledge exchange (between farmers and customers) at the markets and the resulting intellectual capital impacts from that exchange. Customers were allowed to select all responses that applied to them in the RMA.

Almost half of Greenmarket customers that participated in the RMAs reported that they discuss what is happening on the farm when purchasing products at the market, with over one-third explicitly talking about opportunities for new products (Figure 6). Between 60 and 70% of consumers reported that shopping at Greenmarket has influenced their perceptions about farmers, farms, or agriculture; of those that reported it did not, most mentioned that they grew up on a farm or already had a high level of knowledge about farmers, farms, agriculture (Figure 7). This number drops significantly when Greenmarket customers are asked how shopping at the Greenmarket influenced their perceptions about rural places (30%).

[Figures 6 and 7 here]

## **Conclusions and Implications**

Using key information gathered from two expert advisory panels, this paper provides key information on the potential impacts on intellectual capital in rural areas from farmer participation in large, urban farmers markets. Key impacts from both panels focused on how participation by farmers in these markets affected customer and farmer education levels related to knowledge generation, awareness, and engagement. Such educational efforts supported increases in the rate of entrepreneurial innovation, idea sharing, reputational effects, and farm diversity in rural areas. Finally, entrepreneurial net gains, supported new product development and value chain innovations in meeting or creating consumer demand. That said, for net gains to be realized, considerations of limited technical assistance, public education, and existing infrastructural resources in rural areas must be addressed.

A unique result from the extension advisory team noted that Greenmarkets educates the (urban) public that it is “cool to be a farmer”, and that “farming is a career with a future.” To the degree this is reflective in new farm/farmer development as a result of the Greenmarkets, rural communities have the potential to see growth in farm numbers, with increased demographical diversity than might traditionally be found in rural places. This can be particularly important given that many of the communities from which farmers supplying Greenmarkets emanate, there are stagnant or declining populations.

The DM results also supported, particularly from the research advisory team, that farmer participation in the Greenmarkets improves the likelihood that market innovations are spread from urban to rural communities (as well as vice versa), and that farm vendors react in response to consumer demand. A benefit of farmers market participation is that consumers provide immediate feedback on products, which can be taken back to farmers' home (rural) communities to spur innovation and entrepreneurial opportunities. Furthermore, extension advisory team members noted that participation in Greenmarkets can lead to formal and informal value chain education, which support new kinds of value chain and product development (including processing initiatives). This signals not only a direct financial benefit to the participating producer, but the indirect impacts that accrue to other rural or urban supply chain businesses. Again, in the context of sufficient technical assistance and/or infrastructural resource capacities

Based on data collected from Greenmarket customers, there is potential for rural impacts as a direct result of the exchange of ideas and immediate feedback that takes place at the market. Further, the empirical results support the forecasts of the research and extension advisory teams. While the effect of consumer interaction with farmers improved urban consumer perceptions about farmers and agriculture, this effect was largely muted with respect to broader perceptions about rural communities as a whole. This has interesting implications for policy development focused on strengthening rural-urban linkages to improve rural communities and economies. At least in this case study, notions of farming and agriculture appear to resonate more with urban consumers than notions of rural. As alluded to in the advisory team meetings, farmers can be thought of as "nodes of transmission." Support for rural development policies may not resonate with urbanites (the majority of Americans); support for rural farmers selling at urban markets may be a more politically palatable way to inject financial and other capital resources into rural places, thereby improving rural development outcomes. In other words, given preliminary evidence that urban-based farmers markets support enhanced rural intellectual capital assets, there is at least some merit to the notion that economic development strategies focused on urban market investment can in fact support rural communities and economies.

This paper provided a preliminary empirical assessment of changes in one form community capital. Project leaders are currently conducting similar assessments of the other forms of capital change and noting the potential interaction effects among them. While useful in advancing understanding of the impacts of local food system development, the approach still falls short in how to appropriately compare different capital change measures (different units of measure) and, furthermore, how such capital accounting can be integrated into a comprehensive analysis linking these changes to other industry impact measures. Applying our area of study on food systems to the methodological approach on assessing rural wealth creation proposed by Johnson et al. (2014) that uses a multi-regional social accounting matrix model to incorporate non-market valued capital assets is a top priority for our continuing research.

## REFERENCES.

- Brown, A., and Lewin, P. 2016. Measuring United States County-level economic resilience to a recession. Presented at the Agricultural and Applied Economics Association Conference. July 26-28, 2015. San Francisco, CA.
- Brown, J.P., Goetz, S.J., Ahern, M.C., Liang, C. 2014. Linkages between community-focused agriculture, farm sales, and regional growth. *Economic Development Quarterly*, 28(1): 5-16.
- Carolan, M., and Hale, J. 2016. “Growing” communities with urban agriculture: Generating value above and below ground. *Community Development*, DOI: 10.1080/15575330.2016.1158198.
- Deller, S.C., Brown, L., Haines, A., and Fortenbery, R. 2014. Local foods and rural economic growth. Department of Agricultural and Applied Economics, University of Wisconsin-Madison Staff, 570.
- Goetz, S.J., and Rupasingha, A. 2006. Wal-Mart and social capital. *American Journal of Agricultural Economics*, 88(5): 1304-1310.
- GrowNYC. 2015. Our farmers and producers. <http://www.grownyc.org/greenmarket/farmers> [Accessed 2 May 2016].
- Gunter, A., and Thilmany, D. 2012. Economic implications of farm to school for a rural Colorado community. *Rural Connections*, 6(2): 13-16.
- Gupta, U.G., and Clarke, R.E. 1996. Theory and applications of the Delphi technique: A bibliography (1975-1994). *Technological Forecasting and Social Change*, 53(2):185-211.
- Henchion, M., and McIntyre, B. 2005. Market access and competitiveness issues for food SMEs in Europe’s lagging rural Regions. *British Food Journal* 107(6):404–22.
- Hughes, D.W., C. Brown, S. Miller, and T. McConnell. 2008. Evaluating the economic impact of farmers’ markets using an opportunity cost framework. *Journal of Agricultural and Applied Economics* 40(1):253-265.
- Hughes, D.W., and O. Isengildina-Massa. 2015. The economic impact of farmers’ markets and a state level locally grown campaign. *Food Policy*, 54:78-84.
- Ilbery, B., Maye, D., Kneafsey, M., Jenkins, T, and Walkley, C. 2004. Forecasting Food Supply Chain Developments in Lagging Rural Regions: Evidence from the UK. *Journal of Rural Studies*, 20:331–44.
- Jablonski, B.B.R. 2014. Rural development through strengthened rural-urban linkages: The case of US local food systems. In *Economic development in rural areas*. P. Dannenberg and E. Kulke (eds). Burlington, VT: Ashgate, pp. 69-82.
- Jablonski, B.B.R., Schmit, T.M., and Kay, D. 2016. The economic impacts of food hubs to regional economies: a framework including opportunity cost. *Agricultural and Resource Economics Review*, 45(1):143-172.
- Johnson, T.G., N. Raines, and J.L. Pender. 2014. Comprehensive Wealth Accounting. In J.L. Pender, T.G. Johnson, B. Weber, and J.M. Fannin, eds. *Rural Wealth Creation*. New York: Routledge, 30-54.

- Kusmin, L. 2015. Rural America at a glance, 2015 edition. Economic Information Bulletin No. (EIB-145). <http://www.ers.usda.gov/publications/eib-economic-information-bulletin/eib-145.aspx> [Accessed 29 February 2016].
- Lev, L., Brewer, L., and Stephenson, G. 2008. Tools for Rapid Market Assessments. *Oregon State University Special Report 1088-E*. [http://smallfarms.oregonstate.edu/sites/default/files/small-farms-tech-report/eesc\\_1088-e.pdf](http://smallfarms.oregonstate.edu/sites/default/files/small-farms-tech-report/eesc_1088-e.pdf) [Accessed 2 May 2016].
- Low, S.A., Adalja, A., Beaulieu, E., Key, N., Martinez, S., Melton, A., Perez, A., Ralston, K., Stewart, H., Suttles, S., Vogel, S., and Jablonski, B.B.R. 2015. Trends in U.S. local and regional food systems. U.S. Department of Agriculture, Economic Research Service. Administrative Publication Number 067.
- O'Hara, J., and Pirog, R. 2013. Economic impacts of local food systems: Future research priorities. *Journal of Agriculture, Food Systems, and Community Development*, 3(4): 35-42.
- Padel, S., and Midmore, P. 2005. The development of the European market for organic products: Insights from a Delphi study. *British Food Journal*, 107(8): 626-646.
- Pender, J. 2015. Measuring the comprehensive people-based wealth of rural communities. Presented at the Agricultural and Applied Economics Association Conference. July 26-28, 2015. San Francisco, CA.
- Pender, J., Marre, A., and Reeder, R. 2012a. Rural wealth creation: Concepts, measures, and strategies. *American Journal of Agricultural Economics*, 94(2):535-541.
- Pender, J., Weber, B., and Fawbush, W. 2012b. Theme Overview: Rural Wealth Creation. Choices, Quarter 1. <http://www.choicesmagazine.org/choices-magazine/theme-articles/rural-wealth-creation/theme-overview-rural-wealth-creation#sthash.YlfIVOPk.dpuf> [Accessed 29 February 2016].
- Pender, J.L., Johnson, T.G., Weber, B.A., and Fannin, J.M. 2014. Rural wealth creation: Introduction and overview. In *Rural wealth creation*. J.L. Pender, B.A. Weber, T.G. Johnson, and J.M. Fannin (eds). London: Routledge, pp. 3-15.
- Putnam, R.D. 2007. E Pluribus Unum: Diversity and community in the twenty-first century: The 2006 Johan Skytte Prize Lecture. *Scandinavian Political Studies*, 30(2): 137.
- Rikkonen, P., Kaivo-oja, J., and Aakkula, J. 2006. Delphi expert panels in the scenario-based strategic planning of agriculture. *Foresight*, 8(1): 66-81.
- Rowe, G., Wright, G., and Bolger, F. 1991. Delphi: A reevaluation of research and theory. *Technological Forecasting and Social Change*, 39(3): 235-251.
- Rupasingha, A., Goetz, S.J., and Freshwater, D. 2006. The production of social capital in US counties. *Journal of Socio-Economics*, 35: 83-101.
- Schmit, T.M., Jablonski, B.B.R., and Mansury, Y. 2016. Assessing the economic impacts of 'local' food system producers by scale: a case study from New York. *Economic Development Quarterly*. Forthcoming, doi:10.1177/0891242416657156.



Swenson, D. 2010. Selected measures of the economic values of increased fruit and vegetable production and consumption in the Upper Midwest. Leopold Center for Sustainable Agriculture, Iowa State University, Ames, IA.

Thilmany McFadden, D., Conner, D., Deller, S., Hughes, D., Meter, K., Morales, A., Schmit, T.M., Swenson, D., Bauman, A., Phillips Goldenberg, A., Hill, R., Jablonski, B.B.R., and Tropp D. 2016. The economics of local food systems: A toolkit to guide community discussions, assessments and choices. U.S. Department of Agriculture, Agricultural Marketing Service Report.

U.S. Department of Agriculture (USDA). 2015. News Release. Release No. 0142.15. Available at: <http://www.usda.gov/wps/portal/usda/usdahome?contentid=2015/05/0142.xml> [Accessed 29 February 2016].

Vidgen, H.A., and Gallegos, D. 2014. Defining food literacy and its components. *Appetite*, 76: 50-59.

Vilsack, T. 2016. New markets, new opportunities: Strengthening local food systems and organic agriculture. U.S. Department of Agriculture Results. April 4, 2016. <https://medium.com/usda-results/new-markets-new-opportunities-strengthening-local-food-systems-and-organic-agriculture-17b529c5ea90#.8lnvnyun7> [Accessed 6 April 2016].

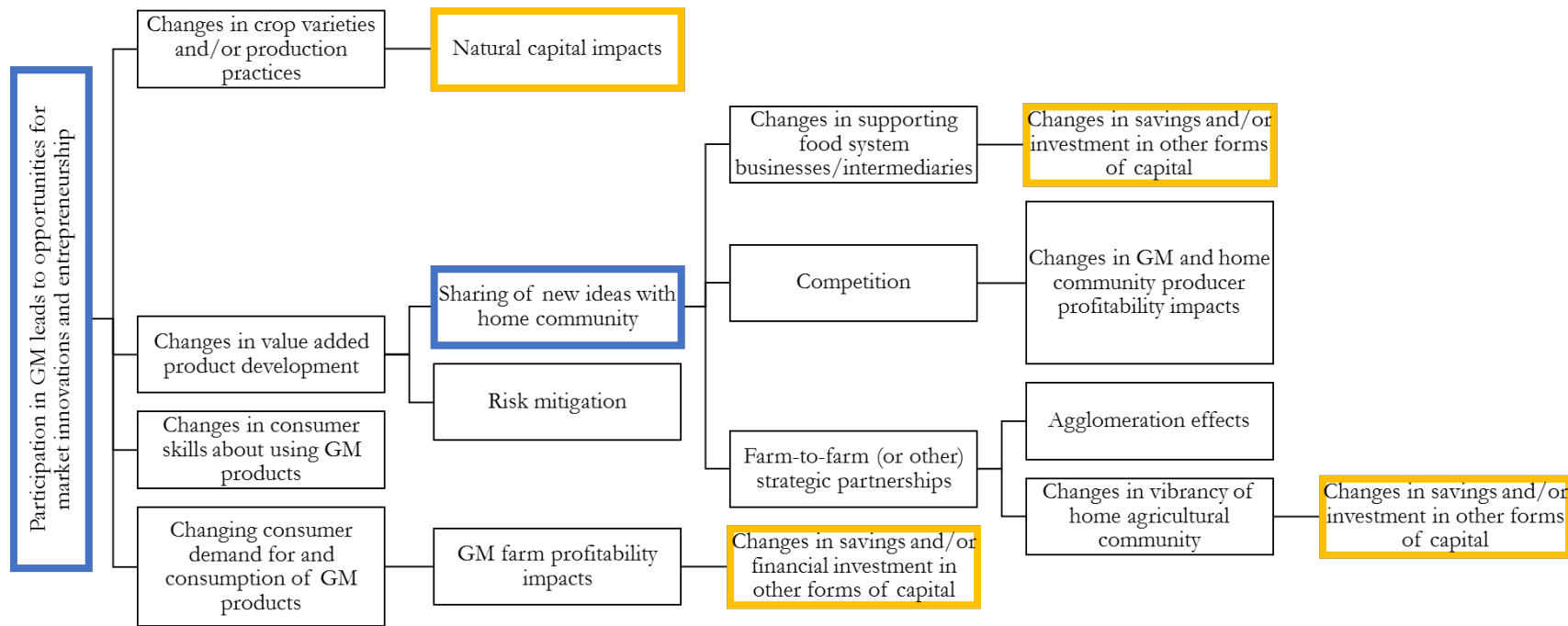
WealthWorks. N.D. Wealth: The eight capitals. The Aspen Institute Communities Strategies Group. <http://www.wealthworks.org/basics/explore-regional-wealth-building/wealth-eight-capitals> [Accessed 2 May 2016].

Wentholt, M.T.A., Fischer, A.R.H., Rowe, G., Marvin, H.J.P., and Frewer, L.J. 2010. Effective identification and management of emerging food risks: Results of an international Delphi survey. *Food Control*, 21(12): 1731-1738.

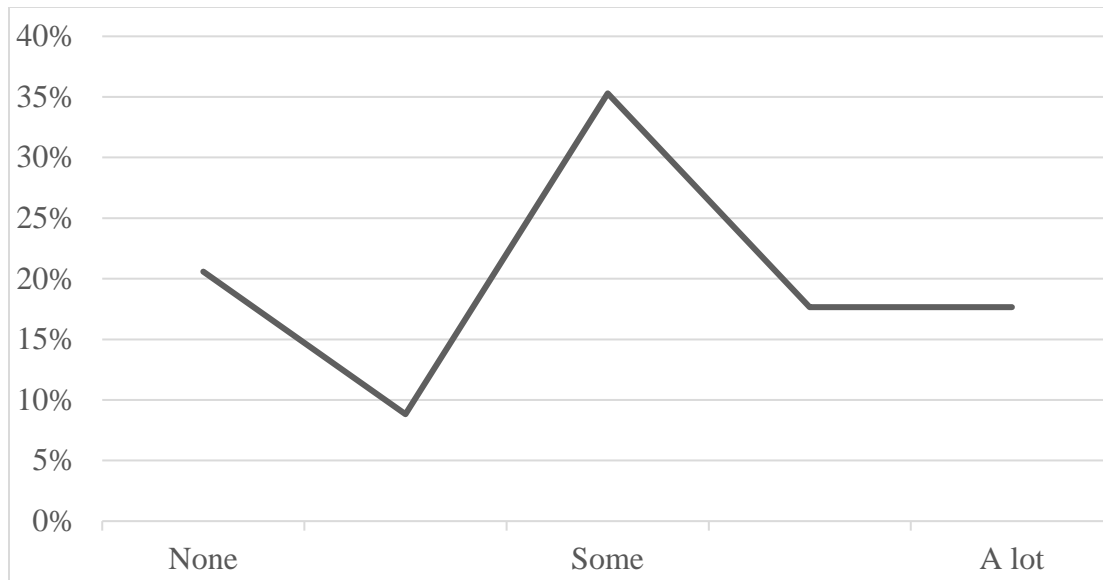
<b>Table 1. Results of the Delphi Method application with the Research and Extension Advisory Teams on prioritized impacts and associated indicators regarding Intellectual Capital in rural areas from farmer participation in Greenmarkets (GM).<sup>1</sup></b>		
<b>Prioritized Impacts from Advisory Teams</b>		<b>Proposed Indicators</b>
<b>Extension Team</b>	<b>Research Team</b>	
<b>GM educates people (farmers and consumers) that it is possible and cool to be a farmer, a career with a future, promoting rural youth retention in agriculture</b>	<b>Market and industry education to and from urban and rural communities</b> <ul style="list-style-type: none"> <li>• Demystification - of city for farmers, of farming for customers (+)</li> <li>• Increased knowledge of food system among consumers (+)</li> <li>• Increased knowledge for farmers of consumer demands (+)</li> <li>• Urban consumer experimentation with new products, new ideas (+/-)</li> <li>• Promotes youth education on cooking, agriculture, health (+)</li> <li>• Strain on rural human resources, expertise, capacity, competition (-)</li> <li>• Limit on public resources (cooperative extension, schools) to help facilitate innovations and new farmer training (-)</li> </ul>	<ul style="list-style-type: none"> <li>○ Urban perceptions of agriculture and rural places</li> <li>○ Urban understanding of policy issues related to agricultural and rural communities</li> <li>○ Farmers better informed of consumer demands</li> <li>○ Level of public education on agriculture</li> </ul>
<b>Marketing to GM leads to collective knowledge of opportunities and exploration of other and/or newer markets</b>	<b>Rate of entrepreneurial innovation and idea sharing among farmers</b> <ul style="list-style-type: none"> <li>• Increasing collaborative networks of farmers, idea sharing at GM (+)</li> <li>• Limited intellectual network expansion with rural (non-GM producers) (-)</li> <li>• Immediate feedback with a larger consumer audience at GM (+)</li> <li>• Increased knowledge of and stimulus to traditional/new production practices, new products, impacts on profitability (+/-)</li> <li>• Greenmarket rules may limit innovation (-)</li> </ul>	<ul style="list-style-type: none"> <li>○ GM farmers share new ideas, marketing techniques with other GM farmers</li> <li>○ GM farmers share new ideas, marketing techniques with rural area farmers</li> <li>○ Change in farmer products, varieties, practices</li> </ul>
<b>GM formal and informal education leads to new kinds of value chain linkages and product development/processing initiatives</b>	<b>Product and value chain innovations to meet or create consumer demand</b> <ul style="list-style-type: none"> <li>• Creative class connections (creating an environment in which entrepreneurial people want to live and work) or gentrification, rural redevelopment (+)</li> <li>• Promotes linkages with local supply chain intermediaries (+)</li> <li>• Misalignment with rural technical, infrastructure capacity (-)</li> <li>• Limited farmworker sharing of ideas about what is required (-)</li> </ul>	<ul style="list-style-type: none"> <li>○ Farmers expand into processed products</li> <li>○ Farmers increase linkages with downstream intermediaries</li> <li>○ New or increased capacity of rural value chain infrastructure</li> </ul>
<sup>1</sup> Project leaders' linked the results from the two teams to illustrate reinforcing and/or competing impacts on intellectual capital.		

**Figure 1. Map of Greenmarket locations.**

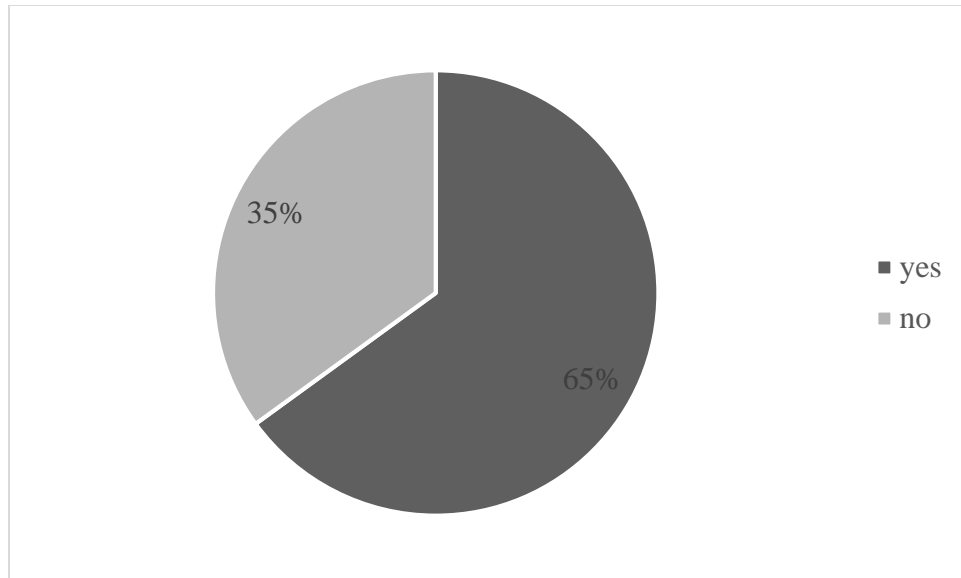
**Figure 2. Map of participating farm vendors in Greenmarkets program, by commodity and location.**



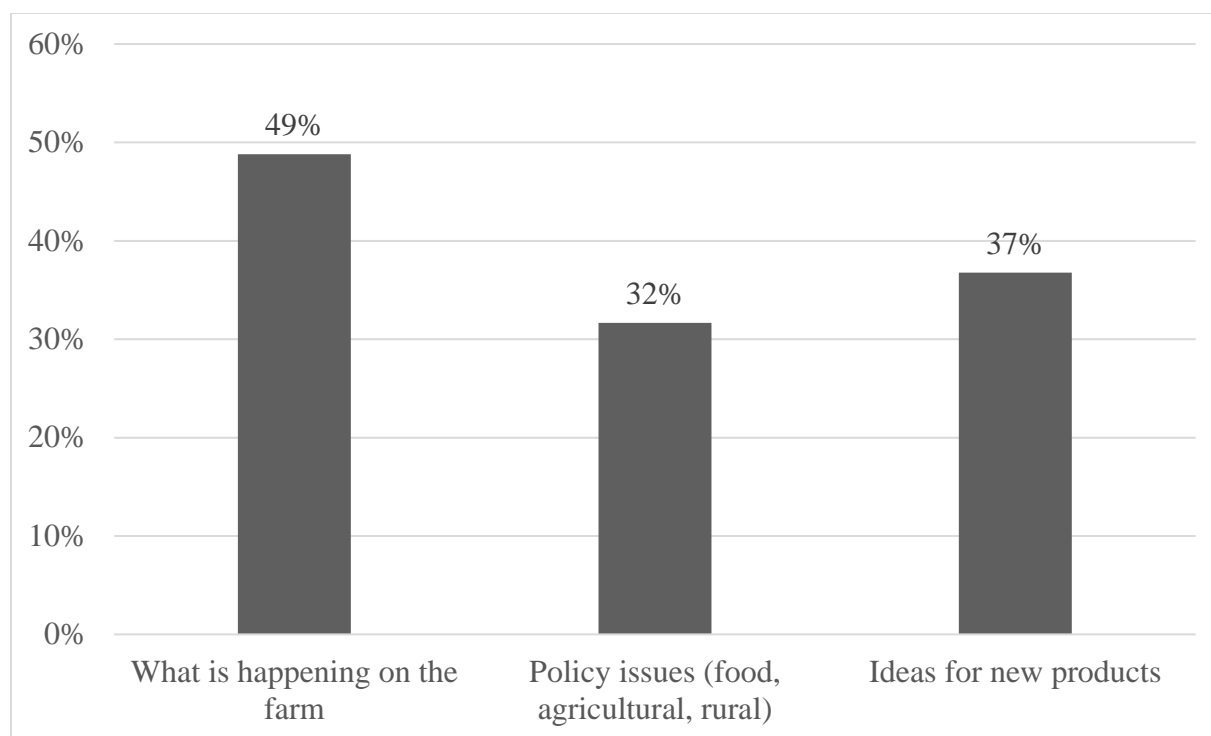
**Figure 3: Pathway of impact transmission for intellectual capital, as identified by the research advisory committee (blue boxes = prioritized impacts; yellow boxes = intersection with other capital assets/forms of wealth).**



**Figure 4: Summary results of Greenmarket farm vendor responses (1 to 5, 1= none, 3=some, 5=a lot) to “Have you gotten any ideas for a new product and/or marketing technique directly through seeing something another vendor did at Greenmarket, talking to a Greenmarket manager, or a conversation with a Greenmarket customer?” (N = 34).**

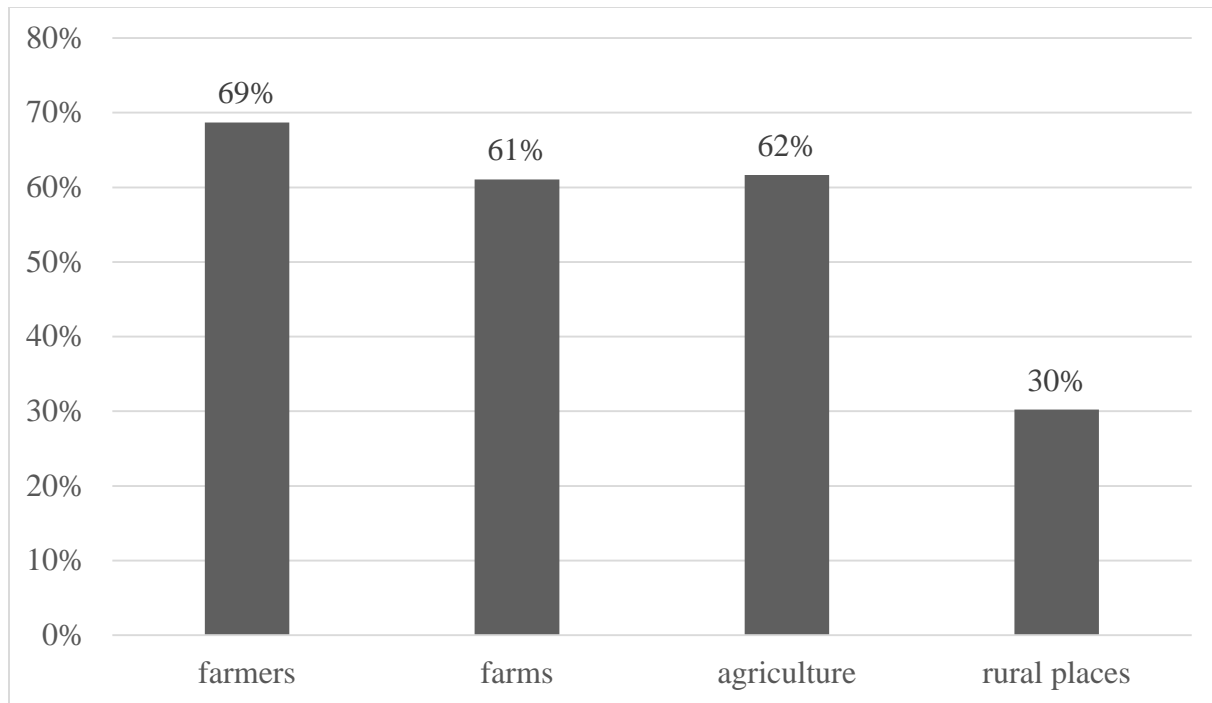


**Figure 5: Summary results of Greenmarket farm vendor responses (yes/no) to “Did Greenmarket participation stimulate interest in your ability to produce value added products?” ( $N = 20$ ).**



**Figure 6: Summary results of Greenmarket customer responses (yes/no) to “When shopping at a Greenmarket, I talk to farmers about...” Three options given, customers checked all that applied ( $N = 824$ ).**





**Figure 7: Summary results of Greenmarket customer responses (yes/no) to “Shopping at Greenmarkets has influenced my perceptions about...” Four options given, customers checked all that applied ( $N = 824$ ).**