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Evaluating barriers to SNAP/EBT acceptance in farmers markets: A survey of farmers

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Abstract

Farmers play a critical role in increasing access to and affordability of fruits and vegetables in low-income communities by accepting Supplemental Nutrition Assistance Program (SNAP) benefits at farmers markets. However, only 40% of farmers

markets nationally accept SNAP benefits. This study evaluates barriers farmers perceive in accepting SNAP in farmers markets. We recruited 134 farmers using convenience sampling from six pre-season regional growers meetings hosted in Alabama; 92 farmers met inclusion criteria and

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completed the anonymous, 51-question survey. The survey measured demographics, perceived barriers and promotional opportunities within constructs of the Social Ecological Model (SEM). We used descriptive statistics to summarize characteristics, and chi-square, Mann-Whitney U and t-tests to analyze differences in characteristics between those farmers who accept SNAP and those who do not. The most frequently cited barriers to SNAP acceptance included lack of internet access, increased burden for processing payments, increased need for bookkeeping, limited availability of information about the application process and payment system, limited support from the market for completing the application, a small customer base and limited number of SNAP clientele. Comparative analyses revealed statistically significant differences in demographics and perceived barriers between those who accept SNAP and those who do not. Findings from this study provide a more in-depth understanding of challenges farmers face in accepting SNAP. These can be addressed through education, policy, systems and environmental solutions at various levels of the SEM to overcome barriers to SNAP acceptance, ultimately increasing access to and affordability of fruits and vegetables for low-income communities.

Keywords

Farmers; Farmers Markets; SNAP; Supplemental Nutrition Assistance Program; Barriers; EBT; Electronic Benefits Transfer; FMA; Farmers Market Authority; Senior Farmers Market Nutrition Program

Introduction and Literature Review

Many Americans do not meet the recommended dietary guidelines for fruit and vegetable intake. Further, individuals with limited resources (defined as individuals with an income eligible for Supplemental Nutrition Assistance Program [SNAP] benefits) consume only half the daily recommended amount of fruits and vegetables (Dong & Lin, 2009).

To promote fruit and vegetable consumption in populations at greatest risk for low intake and the associated chronic diseases, local, state and federal policies to improve access to these foods

are encouraged (U.S. Department of Agriculture [USDA], Office of Communications, 2016). One evidenced-based strategy developed by the Centers for Disease Control and Prevention (CDC) focuses on starting or expanding farmers markets (Keener, Goodman, Lowry, Zaro, & Kettel Khan, 2009). The number of farmers markets in the U.S. has increased by more than 50% since 2006 (Phillips, 2007; USDA, n.d.-a). Nevertheless, access to farmers markets in low-income communities remains limited.

Another important policy focus is to improve the affordability of fruits and vegetables in low-income populations. The CDC and United States Department of Agriculture (USDA) encourage partnerships between farmers markets and food assistance programs, such as SNAP (USDA, 2014a). In 2016, however, only 40% of farmers markets accepted SNAP (calculated from data in USDA, 2017a; 2017b), and purchases made at farmers markets represented only 0.02% of total SNAP redemption (USDA, 2017a). Understanding barriers to SNAP acceptance at farmers markets is important to increase these indicators.

One major barrier to SNAP acceptance and redemption at farmers markets is the EBT payment system (Dixit-Joshi, Burke, Das & Steketee, 2013). Changes in the payment processing mechanism for accepting SNAP benefits contributed to a decline in SNAP acceptance at farmers markets (Dixit-Joshi et al., 2013). During the transition from paper SNAP benefits to the electronic benefit transfer (EBT) payment system, SNAP redemption in farmers markets nationwide dropped from US\$6.5 million in 1994 to US\$2.7 million in 2004 (Briggs, Fisher, Lott, Miller & Tessman, 2010). This drop in acceptance may be at least partially attributed to markets operating in sites which often lack the electricity and landline phone connectivity necessary to operate the EBT payment system (Bertmann, Ohri-Vachaspati, Buman & Wharton, 2012). Although wireless sales terminals were introduced to overcome technical barriers presented by the EBT payment system, these may be inaccessible to market vendors due to the associated fees, which can include a one-time terminal purchase fee, a monthly service fee and a fee for each transaction (USDA, Food and

Nutrition Services, 2010). Federal funding is available to offset these costs for up to three years (Johnson, 2014). Markets also may seek funding assistance through city governments, public health departments, grants or nonprofit organizations (Roubal, Morales, Timberlake & Martinez-Donate, 2016).

Other barriers to SNAP acceptance at farmers markets have been identified. Small farmers market size (Roubal et al., 2016); limited number of SNAP customers (Dixit-Joshi et al., 2013); costs of additional staffing, bookkeeping, and other “back office” management (Dixit-Joshi et al., 2013); difficulty obtaining information about the program from appropriate agencies (Dixit-Joshi et al., 2013); and limited understanding by market vendors of the potential sales increase (Hasin & Smith, 2016) have been identified as challenging factors associated with SNAP acceptance at markets.

Although numerous barriers to SNAP acceptance at farmers markets have been identified, the overwhelming majority of these studies were conducted with farmers market managers (Dixit-Joshi et al., 2013; Hasin & Smith, 2016; Roubal et al., 2016; Ward, Slawson, Wu & Jilcott Pitts, 2015). To our knowledge, no research has been conducted with a sample of farmers to determine barriers this population faces in accepting SNAP at farmers markets. This is an important population to target given the significance of farmers accepting SNAP at market booths as opposed to a single terminal at the farmers market. A study by Buttenheim, Havassy, Fang, Glyn, and Karpyn (2012) observed a 38% redemption increase in markets where farmers operated terminals at their booths rather than a single, centralized market terminal.

The purpose of this formative research study, then, was to describe individual, interpersonal, organizational, community, and public-policy barriers perceived by farmers related to accepting SNAP at farmers markets. Furthermore, we were interested in comparing the barriers perceived by those farmers who accept SNAP versus those who do not. The findings of this study will be used to develop strategies and resources to increase the number of farmers who accept SNAP at farmers markets, which is important to increasing the affordability of fruits and vegetables for low-

income shoppers while also increasing economic opportunities for farmers and communities (Bertmann et al., 2012).

Applied Research Methods

We surveyed a sample of farmer vendors to determine the attributes of farmers relevant to SNAP acceptance. The Social Ecological Model (SEM) served as the theoretical framework for this study. This particular theory promotes understanding of the interaction among individual or environmental factors and resulting behavior (Simons-Morton, McLeroy, & Wendel, 2011). The five SEM constructs (individual, interpersonal, organizational, community and public policy) determined the farmer characteristics that were important to measure within the three variables (demographics of farmers participating in farmers markets, barriers to SNAP acceptance at farmers markets and promotional opportunities to encourage SNAP acceptance and use at markets). We developed survey questions based on these characteristics and variables.

Sample

We partnered with the Alabama Farmers Market Authority (Alabama FMA) to recruit study volunteers. During spring 2017, we solicited a convenience sample of farmers attending Alabama FMA pre-season, growers meetings hosted in six regions of Alabama. Attendees who volunteered to complete the survey and met study criteria were included in the study.

We defined inclusion criteria as Alabama farmers 19 years of age or older and those who previously participated in a farmers market, were participating in a market at the time of the study or planned to participate in a market in 2017. Participants were excluded from the study if they did not sell food products. Since this was formative research, we did not conduct a power analysis to determine a targeted sample size, but we attempted to survey all farmers attending pre-season regional growers meetings.

Instrumentation

We developed an anonymous, 51-question survey organized by variable (demographic, barrier or

promotional opportunity) and theoretical construct (individual, interpersonal, organizational, community and public policy), generating questions using the Direct Marketing Farmer Survey by the USDA (Dixit-Joshi et al., 2013) and other validated surveys (Bertmann et al., 2012; Cole, McNees, Kinney, Fisher, & Krieger, 2013; Funderburk, Struempler, Parmer, & Griffin, 2018; Hasin & Smith, 2016; Jones, 2014).

Demographics

The survey included 14 questions to determine demographics. Eleven questions assessed typical individual demographics, one question described interpersonal demographics (e.g., area where one lives, such as urban, suburban or rural) and two questions determined organizational demographics (e.g., type of market, such as year-round or seasonal, and SNAP/EBT acceptance at the market, such as acceptance allowed using centralized system, acceptance allowed at individual booths or acceptance not allowed).

Barriers

The survey included 28 questions to determine challenges farmers face in accepting SNAP at individual vendor booths. Three questions assessed individual barriers; three questions identified interpersonal barriers that focused on support available from other market vendors; six questions addressed organizational barriers that focused on support available at the market; three questions identified community barriers that focused on support available from local agencies; and 13 questions addressed public-policy barriers that focused on support available from state and federal agencies, as well as other policy issues influencing application or processes to accept SNAP.

Promotional opportunities

The survey included nine questions to determine promotional opportunities to encourage SNAP acceptance and use at markets. Two questions determined individual promotional opportunities (e.g., SNAP acceptance increases sales, and the importance of posting signs at individual booths to advertise SNAP acceptance), two questions identified interpersonal promotional opportunities (e.g.,

the importance of distributing printed materials and the use of social media to advertise SNAP acceptance), two questions addressed organizational promotional opportunities (e.g., the importance of posting signs and using an incentive program at the market to promote SNAP acceptance) and three questions described community promotional opportunities (e.g., the importance of posting billboards or banners around the community, using mass media or providing other means of community outreach to advertise SNAP acceptance).

Procedures

We collaborated with the Alabama FMA to identify dates and locations of pre-season regional growers meetings. The Alabama FMA invited farmers to meetings. Once a growers meeting began, a representative from the Alabama FMA used a recruitment script to introduce the study. We distributed an informational letter and survey to each participant and facilitated survey completion using a facilitator survey guide. Participants submitted completed surveys and received a T-shirt in appreciation of their study participation. The study protocol was approved by Auburn University's Institutional Review Board.

Statistical analysis

Survey data were analyzed using SPSS version 24 for Windows. We used descriptive statistics to determine means and percents for demographics, barriers and promotional opportunities. We conducted appropriate comparative analyses, including chi-square, Mann-Whitney U, and *t*-test, to assess differences in demographics, barriers and promotional opportunities between those who accept SNAP and those who do not accept SNAP. A *p*-value of $<.05$ was considered statistically significant.

Results

A total of 134 farmers attended six pre-season regional growers meetings, and 110 completed the survey. Our analyses included 92 farmers who met inclusion criteria. No statistically significant differences were observed between those who met inclusion criteria and those who did not.

Demographic Characteristics

The average respondent was a 66-year-old, non-Hispanic, white male who had earned a high school diploma or GED. Most in the sample lived in rural Alabama and have farmed for an average of 24.7 years. More than 85% of farmers surveyed were currently participating or planned to participate in a year-round or seasonal farmers market. Participation in a market averaged 9.4 years, and a majority of markets were seasonal. Most markets allowed SNAP acceptance at individual booths, and the majority of farmers surveyed were aware they could accept SNAP. However, most farmers accepted cash only; 59.3% did not accept SNAP. See Tables 1 and 2 for demographic characteristics of surveyed farmers and the farmers markets attended by surveyed farmers.

Comparative analyses indicated those who accepted SNAP had a higher frequency of completing a college degree than those who did not accept SNAP (37.2% vs. 22.5%, respectively; $p=.045$).

Barriers

Individual, interpersonal, organizational, community and public-policy barriers perceived by farmers regarding SNAP acceptance at farmers markets are summarized below.

Individual barriers

The majority of farmers surveyed (79.0%) knew they could accept SNAP at farmers markets. However, a significant difference ($p=.001$) was determined between those accepting and those not accepting SNAP. A greater number of farmers who accept SNAP (93.5%) were aware of the ability to accept SNAP at markets compared to those who did not

Table 1. Demographic Characteristics of Surveyed Farmers

	Mean (SD) or %
Age (n=88)	66.26 (13.10) years
Gender (n=87)	
Male	71.7%
Female	22.8%
Hispanic/Latino (n=83)	
Yes	2.4%
No	97.6%
Race (n=88)	
American Indian or Alaskan Native	3.4%
Black/African American	3.4%
White/Caucasian	88.6%
Other	4.5%
Education (n=88)	
Some high school	18.2%
Graduated high school or earned general education diploma (GED)	33.0%
Some college	21.6%
Associate's degree	9.1%
Bachelor's degree	10.2%
Professional or graduate degree	8.0%
Locale (n=87)	
Urban	5.7%
Suburban	1.1%
Rural	93.1%
Length of Time Farming (n=89)	24.65 (17.57) years
Market Participation (n=92)	
Currently participate or plan to participate this year	85.8%
Do not participate in a market	14.2%
Length of Market Participation (n=89)	9.4 (11.68) years
SNAP Acceptance at Vendor Booth at Market (n=86)	
Do not accept SNAP	59.3%
Accepts SNAP	40.7%
Method for Accepting Payment at Vendor Booth (n=83)	
Debit/credit card reader	6.0%
Debit/credit card reader that accepts SNAP	9.6%
SNAP card reader	4.8%
Cash only	79.5%
Awareness of Ability to Accept SNAP (n=76)	
Farmers who were aware of their ability to accept SNAP	79.0%
Farmers who were unaware of their ability to accept SNAP	6.5%
Farmers who were neutral about their ability to accept SNAP	14.5%

n=sample size; SD=standard deviation

Table 2. Demographic Characteristics of Farmers Markets Attended by Surveyed Farmers

	Mean (SD) or %
Market Type (n=90)	
Year-round	13.3%
Seasonal	86.7%
SNAP Acceptance Policies (n=77)	
SNAP acceptance not allowed at the market	15.6%
SNAP acceptance allowed at individual vendor booths	77.9%
SNAP acceptance allowed using a centralized system organized by the market	6.5%
Utilities	
Electricity (n=79)	89.8%
Water (n=73)	83.0%
Internet (n=3)	3.4%
Customers (n=87)	
Fewer than 100 customers daily	71.0%
100 or more customers daily	29.0%

n=sample size

accept SNAP (66.7%).¹ Table 3 provides descriptive statistics and findings from comparative analyses for the other individual barriers.

Interpersonal barriers

Respondents reported minimal interpersonal barriers. Specifically, respondents felt that fellow vendors at their market were supportive in providing information about the SNAP application process (46.3%) and payment system (37.7%) and in assisting with completing applications (29.4%).

We noted significant differences when comparing interpersonal barriers of those accepting SNAP and those not accepting SNAP. A greater number of farmers who accept SNAP (79.3%) felt that information about the application process for SNAP acceptance was readily available from other vendors at their market compared to those who did not accept SNAP (23.1%, $p<.001$). Similar trends were found regarding fellow vendors at the market providing information about the payment system ($p<.001$) and supporting completion of the

¹ The data for this are based on two survey questions. It appears that 6.5% of farmers who responded that they accept SNAP must have also selected "no" to the questions about awareness of ability to accept SNAP. We feel these data are

application for SNAP acceptance ($p=.003$). Table 3 provides further information about interpersonal barriers.

Organizational barriers

The most mentioned organizational barrier was a lack of internet access (96.6%). Other organizational barriers included a small customer base and a limited SNAP customer base. See Table 2 for characteristics of farmers markets attended by surveyed farmers.

Over a third of respondents felt that markets were supportive in providing information about the SNAP application process (37.0%), but a smaller share felt that markets were supportive in providing information about the payment system (20.9%) and assisting with application completion (18.6%).

Significant differences were determined between those accepting SNAP and those not accepting SNAP. A greater share of surveyed farmers who accept SNAP (63.3%) felt information about the application process for SNAP acceptance was readily available from their market compared to those who did not accept SNAP (20.5%, $p=.001$). A similar result was found regarding markets providing information about the payment system ($p=.001$). Table 3 provides more information on organizational barriers.

Community barriers

Respondents expressed a strong sense of community support from local agencies, such as County Extension, in providing information about the application (46.6%) and payment system (43.3%) and assisting with application completion (36.8%).

We noted significant findings when comparing community barriers between those accepting SNAP and those not accepting SNAP. A greater number of farmers who accept SNAP (71.0%) felt

important because this comparative analysis reveals that those who were unaware of their ability to accept SNAP were 26.8% less likely to accept SNAP, highlighting the importance of awareness of SNAP acceptance at farmers markets.

Table 3. Barriers to SNAP Acceptance of Farmers Who Accept SNAP and Those Who Do Not Accept SNAP at Farmers Markets

Individual	Survey Question by Construct of Social Ecological Model	Does not Accept SNAP (%) (n=51)			Accepts SNAP (%) (n=35)			Between Groups p-value
		Agree	Neutral	Disagree	Agree	Neutral	Disagree	
	I know farmers can accept SNAP as payment for goods at farmers markets	66.7	22.2	11.1	93.5	6.5	—	.001*
	Accepting SNAP (formerly food stamps) requires me to report personal information I am not willing to give	31.0	52.4	16.7	24.1	37.9	37.9	.163
Interpersonal								
	Information about...							
	...the application process for SNAP acceptance at markets is readily available from other vendors at the market where I participate	23.1	51.3	25.6	79.3	6.9	13.7	<.001*
	...payment systems for accepting SNAP at markets is readily available from other vendors at the market where I participate	17.1	46.3	36.6	69.0	20.7	10.3	<.001*
	Support for completing the application for SNAP acceptance is readily available through other vendors at the market where I participate	5.0	60.0	35.0	41.4	37.9	20.7	.003*
Organizational								
	Information about...							
	...the application process for SNAP acceptance is readily available at the market where I participate	20.5	40.9	38.6	63.3	16.7	20.0	.001*
	...payment systems for accepting SNAP at markets is readily available at the market where I participate	5.1	43.6	51.3	44.8	37.9	17.2	.001*
	Support for completing the SNAP application is readily available through the market where I participate	7.1	61.9	31.0	37.9	34.5	27.6	.076
	There are not enough SNAP customers to accept SNAP	38.7	45.5	15.9	37.9	20.7	41.4	.534
Community								
	Information about...							
	...the application process for SNAP acceptance at markets is readily available through local agencies	27.9	41.9	30.3	71.0	19.4	9.7	<.001*
	...payment systems for accepting SNAP at markets is readily available through local agencies	20.5	51.3	28.2	75.9	13.8	10.3	<.001*
	Support for completing the application for SNAP acceptance is readily available from local agencies	23.8	57.1	19.1	55.6	33.3	11.1	.015*
Public Policy								
	Information about...							
	...the application process for SNAP acceptance at markets is readily available from state agencies	43.9	31.7	24.4	83.4	10.0	6.6	.001*
	...the application process for SNAP acceptance at markets is readily available from federal agencies	37.8	42.2	20.0	83.4	3.3	13.3	.001*
	...payment systems for accepting SNAP at markets is readily available from state agencies	37.8	45.9	16.2	80.7	12.9	6.4	.001*
	...payment systems for accepting SNAP at markets is readily available from federal agencies	31.0	47.6	21.5	69.0	17.2	13.8	.006*
	Support for completing the application for SNAP acceptance is readily available through state agencies	35.0	52.5	12.5	72.4	20.7	6.8	.003*
	Support for completing the application for SNAP acceptance is readily available through federal agencies	14.6	65.9	19.5	56.7	36.7	6.7	<.001*
	The application for SNAP acceptance at markets is easy to access	16.7	45.2	38.1	58.6	20.7	20.6	.003*
	The application for SNAP acceptance at markets is easy to complete	14.3	54.8	30.9	55.2	27.6	17.2	.003*
	USDA reviews and responds to applications for SNAP acceptance in a timely manner	16.3	67.4	16.3	63.3	33.3	3.3	<.001*
	There are strict requirements for becoming approved to accept SNAP	39.0	51.2	9.4	50.0	35.7	14.3	.624
	Accepting SNAP increases the time it takes to process individual payments	33.3	42.9	23.8	56.7	26.7	16.7	.082
	Accepting SNAP requires additional bookkeeping	52.3	33.3	14.3	61.3	19.4	19.4	.841
	Accepting SNAP requires additional staffing	24.4	48.8	26.8	17.2	27.6	55.2	.074
	The application for SNAP (formerly food stamps) acceptance asks personal information I am not willing to give	19.5	63.4	17.1	24.1	48.3	27.5	.724

n=sample size; *Significance p<.05; difference based on Mann-Whitney U nonparametric tests

information about the application process for SNAP acceptance was readily available from local agencies compared to those who did not accept SNAP (27.9%, $p<.001$). Similar trends were noted regarding local agencies providing information about the payment system ($p<.001$) and supporting completion of the application for SNAP acceptance ($p=.015$). Further information on community barriers is available in Table 3.

Public policy barriers

Farmers responded they felt a great deal of support from state and federal agencies. Respondents primarily agreed state agencies, like Alabama FMA, were supportive in providing information about the application process (61.4%) and payment system (56.7%) and assisting with application completion (50%). They reported less support but similar trends from federal agencies. As with these same characteristics for organizational and community barriers, significant findings were noted between those accepting SNAP and those not accepting SNAP (see Table 3).

Farmers agreed the application for SNAP acceptance was easy to access (35.2%), easy to complete (31.4%) and quickly reviewed by USDA (36.1%); however, 42.6% of respondents agreed the requirements to apply for SNAP acceptance were too stringent.

A comparative analysis between those who accept SNAP and those who do not accept SNAP revealed differences in key public-policy barriers. The majority of those who accept SNAP agreed the application for SNAP acceptance at markets is easy to access (58.6%) and complete (55.2%). However, those who do not accept SNAP felt significantly different about the ease of application accessibility (16.7%, $p=.003$) and completion (14.3%, $p=.003$). Also, a significant difference ($p<.001$) was noted on agreement with the USDA reviewing and responding to an application in a timely manner between those accepting SNAP (63.3%) and those not accepting SNAP (16.3%).

Lastly, a large percent of farmers completing the survey perceived an increased burden for processing payments (44.4%) and an increased need for bookkeeping (56.2%) and staffing (40%). No significant differences were noted in these

characteristics between those accepting SNAP and those not accepting SNAP.

Promotional Opportunities

Individual, interpersonal, organizational, and community promotional opportunities to encourage SNAP acceptance and use at Alabama farmers markets are summarized below.

At the individual level, more than 65% of farmers meeting inclusion criteria agreed accepting SNAP increases sales, and an overwhelming majority of these farmers (87.3%) felt it was important to post signs at individual vendor booths to advertise SNAP acceptance.

Among interpersonal promotional opportunities, 68.0% of farmers agreed social media advertising and 76.6% agreed printed materials are important marketing efforts for SNAP promotion.

The most prevalent organizational promotional opportunity included posting signs at the market to advertise SNAP acceptance (85.9%) followed by using incentive programs to promote SNAP use (45.8%).

Survey responses revealed several promotional opportunities at the community level. More than 70% of farmers agreed it is important to post billboards or banners around town (74.7%), use mass media (75.6%), and provide community outreach (73.7%) to advertise SNAP acceptance.

No significant differences were noted in solutions between those accepting SNAP and those not accepting SNAP.

Discussion

Several factors contributed to the growth of farmers markets in the past decade, including efforts by the USDA, nonprofits and private agencies to connect farmers to consumers (King, Dixit-Joshi, MacAllum, Steketee, & Leard, 2014); however, SNAP acceptance at farmers markets has seen much slower growth. The current study utilized the SEM as a theoretical framework to describe demographics, determine farmer-perceived barriers and identify promotional opportunities to encourage SNAP acceptance and use at markets. The most prevalent barriers to SNAP acceptance identified through this formative study with farmers included lack of internet access at the market, increased

burden for processing payments, increased need for bookkeeping, limited availability of information regarding the application process and payment system available from the market, limited support for completing the application available from the market, a small customer base and lack of SNAP clientele. These findings are consistent with previous work conducted with market managers (Bertmann et al., 2012; Dixit-Joshi et al., 2013; Hasin & Smith, 2016; Roubal et al., 2016). Furthermore, the current study compared demographics, barriers and promotional opportunities between those who accept SNAP and those who do not. Several themes emerged as a result of the comparative analysis. Findings from this study provide a more in-depth understanding of the challenges farmers face in accepting SNAP, which can be addressed through education, policy, systems, and environmental solutions at various levels of the SEM to overcome barriers to SNAP acceptance, ultimately improving the affordability of fresh fruits and vegetables in low-income communities.

Education

In this study, we explored education as a demographic characteristic. Comparative analysis revealed a significant difference in education level between those accepting SNAP and those not accepting SNAP. Because of the stark difference, it is important to recognize this demographic characteristic as a potential barrier to SNAP acceptance.

Agriculture and food system development depends largely on the adoption of new technology. The likelihood of adapting to agricultural technology can be explained by several factors, including a farmer's education (Herath, 2013). While agricultural technology is defined by advancements in farming devices, such as sensors, machines and information technology used for farming (USDA, n.d.-c), EBT is a form of information technology used for the sale of food. In the present study, comparative analysis revealed those who accepted SNAP had a higher frequency of completing a college degree than those who did not accept SNAP. These findings support the work by Herath (2013).

The average age of a farmer in the United

States is 58 years (Williamson & Williams, 2017), and the average farmer surveyed in this study was 66 years. However, nationwide there is a shift toward younger, college-educated farmers. Census data shows that between 2007 and 2012, the proportion of farmers under the age of 35 years had increased by 2.2% nationally (USDA, 2014b). Since beginning farmers are more likely than established farmers to have at least a 4-year college degree (Williamson & Williams, 2017), the rise in young, educated farmers is promising for the future of SNAP acceptance at farmers markets.

Payment Processing System

Changes from paper vouchers to the EBT payment system contributed to a decline in SNAP acceptance by farmers market vendors, leading to a drastic effect on the number of SNAP participants shopping at farmers markets (Dixit-Joshi et al., 2013). This decline in acceptance may be attributed to markets operating at sites which lack electricity and landline phone connectivity necessary to operate the EBT payment system (Bertmann et al., 2012). Wireless payment systems, which function using wireless cell phone service, have been developed to increase the ability to accept SNAP at markets lacking wired connectivity (Maricopa County Department of Public Health, n.d.). USDA addressed this challenge beginning in FY2013 with the first wireless equipment program, through which it provided wireless terminals for the acceptance of SNAP. In the current iteration of the "free equipment program," USDA partnered with the Farmers Market Coalition to provide farmers markets and direct marketing farmers with free wireless equipment, such as the National Association of Farmers Market Nutrition Programs' MarketLink Program (Farmers Market Coalition, n.d.). However, many rural areas lack the access to cell phone service (Wilkins, 2016) required to operate these machines and thus rely on a WiFi internet connection to accept wireless payments. The current study revealed most markets in Alabama provide electricity and water; however, nearly 97% of farmers surveyed indicated their markets do not provide internet access. Markets in rural areas lacking wireless cell phone service should consider establishing landline phone connectivity to allow for operation

of a wired SNAP payment system or consider establishing an internet connection to take advantage of government-funded wireless SNAP card readers.

An additional option for small markets in rural areas is to accept SNAP benefits using manual vouchers. When using this system, customers do not swipe their EBT card. Rather, the vendor records the EBT card number and transaction information on a paper manual voucher form and then calls the state's EBT processor to verify funds are available in the customer's EBT account. A hold for the appropriate amount is then placed on the customer's EBT account. The customer signs for the transaction; the voucher is mailed to the state EBT processor, who redeems manual EBT vouchers and deposits funds into the farmer's bank account within two business days (USDA, n.d.-b). This method is time-consuming and may not be optimal for most market types. However, this option could be feasible for markets in rural areas that lack connectivity and have a limited SNAP customer base, redeeming US\$100 or less in monthly SNAP benefits (Baesler, 2010). A similar voucher program is the Senior Farmers Market Nutrition Program (SFMNP) (USDA, 2015). This system has been successful in providing low-income seniors with coupons to use at farmers markets in even the hardest-to-reach rural areas. In 2017, all SFMNP funds for Alabama had been distributed by June (Alabama Farmers Market Authority, 2017), indicating a strong interest in and utilization of a voucher program. Increasing awareness of the manual voucher option for SNAP acceptance among farmers servicing rural farmers markets may promote SNAP redemption in these areas, which sometimes lack the infrastructure necessary to operate the EBT payment system.

Another barrier to using the EBT payment system in farmers markets is the increased burden for processing payments, which was identified in the current study as a public policy barrier. These results agree with findings from a sample of market managers reported by previous work (Roubal et al., 2016). In 2016, Roubal and colleagues led qualitative interviews of market managers to understand challenges markets face in accepting SNAP. Market managers identified the amount of work required

to accept SNAP as a primary barrier (Roubal et al., 2016).

The present study also identified bookkeeping responsibilities as a public policy barrier related to the payment system for SNAP acceptance. This finding is in agreement with the National Survey of Farmers Market Managers and Direct Marketing Farmers led by Dixit-Joshi and colleagues (2013), who reported additional bookkeeping required to accept SNAP as one of the top three barriers.

While accounting responsibilities, including payment processing and bookkeeping, associated with operating a card payment system may be greater than accepting cash only, SNAP acceptance by farmers markets has been shown to increase profits while also broadening access to fruits and vegetables for low-income shoppers (Bertmann et al., 2012). A pilot study led by Bertmann and colleagues in 2012 showed an increase in sales ranging from US\$500 to US\$4,018 during a 10-week study period at farmers markets implementing SNAP acceptance.

Furthermore, SNAP acceptance by individual vendors may lead to an even greater profit. In 2012, Buttenheim et al. found that SNAP acceptance at individual vendor booths increased sales by up to 38% compared to markets operating a centralized system. Focusing on direct education at multiple levels of the SEM regarding financial benefits resulting from SNAP acceptance may promote SNAP acceptance by farmer vendors, ultimately outweighing the public policy barriers of additional time required for processing payments and requirements for bookkeeping.

Information and Support

Surveyed farmers' perceptions of the availability of information on the application process and payment system and support for completing the application varied among levels of the SEM and between those who accept SNAP and those who do not. From these data, unique themes emerged.

Farmers perceived availability of information on the application process and payment system and support for completing the application to be most available from the state agency, followed by federal agencies, local agencies and other vendors at the farmers market. Finally, farmers perceived the least

support from markets. Market managers should prioritize providing information about the application process and payment system and supporting completion of the application as organizational strategies to increase the number of farmers who accept SNAP. Direct education by state and local agencies for market managers about these processes may be necessary to increase their understanding and share ways to support farmers in accepting SNAP.

Well-functioning farmers markets are the result of collaboration and support among market vendors (Griffin & Frongillo, 2003). This study supports this concept by demonstrating the greatest variation between those vendors who accepted and those who did not accept SNAP was the availability of information about the application process from other vendors at the market. Vendor support may be key in successful implementation of SNAP acceptance. The study by Griffin and Frongillo (2003) found farmers' initial involvement in farmers markets was motivated by personal economic benefits, but eventually, farmers recognized the importance of collaboration with other market vendors to gain even more personal economic benefits. Therefore, direct education with vendors regarding collaboration and support in applying for, setting up and utilizing the payment system for SNAP acceptance may be warranted.

Clientele Volume

The current study identified a small customer base and limited SNAP clientele as predominant organizational barriers to SNAP acceptance. These results are consistent with a previous study conducted by Roubal et al. who found market managers with fewer than 30 vendors had "concern about the volume of EBT transactions small markets could produce" (2016, p. 151). Dixit-Joshi et al. (2013) also reported the lack of SNAP customers as the primary factor in not accepting SNAP at farmers markets. Further, Wetherill and Gray (2015) reported many participants in their study, which included urban SNAP beneficiaries receiving Temporary Assistance for Needy Families (TANF), did not perceive themselves as people who shop at farmers markets. Thus, in addition to marketing strategies increasing awareness of SNAP

acceptance at farmers markets, it also is imperative to improve consumer perceptions of the availability and accessibility of fruits and vegetables at farmers markets.

In 2006, the USDA Agricultural Marketing Service awarded the first Farmers Market Promotion Program (FMPP) grants to aid in the development and promotion of farmers markets. As a result of FMPP activities specific to SNAP acceptance, a fourfold increase in SNAP sales at farmers markets was observed between 2009 and 2012 (King et al., 2014). In the present study, farmers agreed it is important to provide signage for advertising SNAP acceptance at individual vendor booths and markets. Markets and vendors may need resources and technical assistance to expand their marketing to, outreach to and engagement with SNAP recipients.

One such resource may be social media and printed marketing materials. The present study identified interpersonal marketing efforts, namely social media and printed materials, as important marketing strategies to promote SNAP acceptance. Over the past decade, use of social media has gained prominence as an effective marketing strategy. The success of social media marketing can be attributed to the low cost and low requirements for technical skills necessary to use and maintain an online presence (Chi, 2014). On the other hand, printed materials, as a traditional form of advertising, may be appropriate for populations who do not engage in social media platforms. Market vendors or managers may choose to promote SNAP acceptance through social marketing campaigns or printed materials, depending on their resources and clientele.

Community marketing efforts to promote SNAP acceptance were identified as important to farmers in the current study and included posting billboards or banners around town and providing community outreach. Billboards have many advantages, such as the potential placement of the advertisement close to the point of sale, high frequency of exposure, 24-hour presence, geographic flexibility and visual impact (Taylor, Franke, & Bang, 2006). By advertising around the community a market's acceptance of SNAP payments, farmers markets have the potential to reach a larger

audience than marketing efforts at the market or at vendor booths alone.

Limitations

We acknowledge that this study has some limitations. A key limitation is a small, convenience sample, and thus this study may not be generalizable to all farmers. In addition, farmers surveyed in this study represented primarily rural settings, and thus the barriers reported may not be representative of barriers farmers face in suburban or urban locales. Furthermore, farmers surveyed were primarily older, white men, limiting the generalizability of our findings.

Although this study had a few shortcomings, a major strength of this formative research was the ability to capture perceptions from a population that has not previously been studied.

Conclusion

Identifying barriers perceived by farmers regarding SNAP acceptance at farmers markets is vital to increasing access to and affordability of fruits and vegetables in low-income communities. This study identified several barriers to SNAP acceptance as perceived by farmers. These barriers are associated primarily with the payment processing system, information availability and support and clientele volume. Strategies for making the payment system for SNAP acceptance more accessible to farmers are warranted. Establishing internet connection or phone connectivity in markets may be one environmental change solution. Farmers perceived information about SNAP and support for SNAP acceptance was the least available from markets. It is

imperative market managers prioritize offering information about the application process and payment system, and support completion of the application for SNAP acceptance as organizational strategies. Lastly, marketing solutions by farmers market vendors are vital to increasing consumer volume and awareness of SNAP acceptance at the market, thus increasing economic opportunities for market vendors.

This study was limited in the number and geographical diversity of participants recruited. Further research should be conducted using a larger sample size and greater geographical diversity. If sampling is limited to a specific geographical area, qualitative research may be important for uncovering specific individual political or personal views regarding SNAP acceptance. Additionally, this study was limited to surveying characteristics and perceived barriers of farmers serving as vendors at farmers markets. Similar to the study by Wetherill and Gray (2015), future studies should address characteristics and perceived barriers to SNAP consumers' use of farmers markets in accessing fruits and vegetables. Future work also should explore solutions identified in this study to ascertain best practices in increasing the number of farmers who accept SNAP at farmers markets, ultimately increasing access to fruits and vegetables in low-income communities.



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