Increased Purchases of Locally Grown Ethnic Greens and Herbs due to Concerns about Food Miles

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Abstract

The purpose of this study was to highlight locally grown ethnic greens and herbs purchases due to concern about food miles and associated impact on purchasing these greens and herbs. A telephone survey was conducted in 16 East Coast states and Washington D.C., May through October of 2010, to document ethnic consumers’ behavior and demand for greens and herbs traditionally used in cuisine, important to their cultures. Data collected can be used to assist small and medium-sized farmers with better understanding consumer perceptions and factors that drive ethnic greens and herbs markets.

Keywords: ethnic consumers, purchasing behaviors, carbon foot print, logit model

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Introduction

As our food system becomes increasingly globalized, the number of miles that food travels from producer to consumer through its supply chain has rapidly expanded. In 2001, an estimated 39 percent of fruits and 12 percent of vegetables that Americans consume were produced in other countries (Pirog and Benjamin 2003). Exporting and importing of food can come with a high price; it can be environmentally critical, spoil regional economies, and hamper many aspects of local communities. Reducing food miles may support local farms, reduce dependency on fossil fuels, and help strengthen local economy and create more self-sufficient communities. The fresh fruit and vegetable trade has raised concerns about the distance that food travels, cost of food, freshness, and climate change associated with the transport. Several studies in the United Kingdom have also indicated that in 2002 the overall transportation contributed to 12 percent of Green House Gas (GHG) emissions (Garnett 2011) and food transportation alone contributed to 77 percent of carbon emissions and produced 19 million tons of carbon dioxide (DEFRA 2005). Buying locally grown produce can help reduce the environmental impact and costs of transportation.

In countries with vast amount of land, like the United States, food must travel great distances from source to market thus affecting energy cost and increases in food prices. According to 1969 data, food traveled an average of 1,346 miles (U.S. Department of Energy 1969) and Hendrickson (1996) estimated that fresh produce traveled 1,500 miles. In 1997 the average pound of fresh produce travelled 1,685 miles from farm to the main wholesale market in Baltimore, Maryland (Hora and Tick 2001), ultimately requiring a great amount of fossil fuels to transport these products. A Canadian study also found that each food item travels an average of 2,811 miles, producing 51,709 tons of greenhouse gas emissions annually (Xureb 2005). Most of fresh produce grown in the U.S. is transported by truck. This transportation cost is making the country increasingly dependent on foreign oil resources with record prices of fuel impacting produce cost. Most projections concluded that food prices would remain relatively high for many years to come because of expanded bio-fuel production, high oil prices, and increased international demand (Diao et al. 2008).

A goal of promoting locally grown foods is to provide a readily available, fresh, nutritious, safe, and sustainable food supply (Kaufman and Jongman 2004). While studying the local food system in Philadelphia, Kremer and DeLiberty (2011) found that only a small portion of the city’s food is currently sourced locally. A strong local food system could also contribute to healthier eating practices and supporting local agriculture to develop better links between farmers and consumers, and greater community control over food issues. Locally grown produce travels fewer miles and consumes less fuel than produce transported from distant regions or countries. Locally grown fruits and vegetables are considered fresher as they are usually transported to market shortly after being harvested. There is also the perception that transporting fresh fruits and vegetables great distances can affect the taste and nutritional value. Previous studies have indicated that consumers feel that locally produced foods were more authentic and of higher quality (Boyle 2003; Lee 2000), fresher (La Trobe 2001), more nutritious, tasty, and safe (Seyfang 2004). These characteristics influence consumers’ overall purchasing decisions. Most consumers look for attributes such as buying locally, promoting good health (Magnusson et al. 2003), protecting the environment (Lea and Worsley 2008; Pretty et al. 2005; Smith et al. 2005; Stagl 2002), and
supporting the local economy (Chambersa et al. 2007). According to a fresh produce survey of New Jersey, respondents preferred Jersey Fresh produce to non-local produce (Govindasamy et al. 1998). Surveys conducted in Iowa, Missouri, Nebraska, and Wisconsin also indicated that consumers were more interested in purchasing locally grown produce (NCIFSP 2002). Studies conducted during 2006 in East Coast states found that 65 percent of Asian consumers (Puduri and Govindasamy 2011) and 80 percent of Hispanic consumers (Govindasamy and Puduri, 2011) were willing to buy locally grown ethnic produce.

Ethnic population concentration in the eastern U.S. is also one of the major reasons to focus and document ethnic consumers’ behavior towards buying culturally significant greens and herbs. The 2010 Census results indicated that Hispanics and Asians were the fastest-growing minority population in the U.S. (U.S. Census Bureau 2010). According to the data, more than half of the growth in the total U.S. population between 2000 and 2010, 27.3 million, was because of the increase in the Hispanic population. Between 2000 and 2010, the Hispanic population grew by 43 percent, rising from 35.3 million in 2000 to 50.5 million in 2010, which was 16 percent of the total U.S. population. During this same period, the Asian population grew faster than any other major racial group, an increase of 44-3 percent. Asians were the second-largest population growing from 10.2 million in 2000 to 14.7 million in 2010 (U.S. Census Bureau 2010). The increasing immigrant population has led to a growth in the number of produce stores that cater to ethnic population in the region. Studies conducted throughout the region have shown that the rising demand for ethnic produce provides a potential opportunity for farmers in the region (Govindasamy et al. 2006; Mendonca et al. 2006; Sciarappa 2003; Tubene 2001). The main objective of this study was to predict ethnic consumer’s increased purchases of locally grown ethnic greens and herbs due to concern about food miles. The study analyzes the results and compares the effects of ethnic consumers’ socio-economic and demographic characteristics on their willingness to buy locally grown ethnic greens and herbs due to concerns about food miles.

Data

A telephone survey of consumers residing in 16 East Coast states (Connecticut, Delaware, Florida, Georgia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, North Carolina, Pennsylvania, Rhode Island, South Carolina, Vermont and Virginia) and Washington D.C. by Perceptive Marketing Research, Inc. (Gainesville, Florida). A separate survey questionnaire was prepared in Spanish for those who were more comfortable responding in this language. The survey was conducted from May through October of 2010 to gather information to assist small and medium-sized farmers with better understanding consumer perceptions and factors that drive ethnic greens and herbs markets, specifically attitudes and behaviors of Asian Indian, Chinese, Mexican, and Puerto Rican consumers. In total, 1,117 completed survey responses were obtained from Chinese (276), Asian Indian (277), Mexican (280), and Puerto Rican (284) ethnic groups. Consumers who met the age requirement of 18 years and older, were the primary food shoppers for the household, and belong to ethnic groups of interest were interviewed. A logit model was developed based on a survey question relating to food miles and purchase of locally grown ethnic greens and herbs.
Model Framework

One of the survey questions respondents answered was whether they increased purchase of locally grown ethnic greens and herbs because of concerns about food miles, and based on this, a logit model was developed to predict the influence of increased purchase of locally grown ethnic greens and herbs. As for the model specification, the binary dependent variable was defined as one if the respondent increased purchase of locally grown ethnic greens and herbs due to concerns about food miles. This study analyzes consumers’ likelihood of increased purchase of locally grown ethnic greens and herbs due to concerns about food miles in order to take advantage of such a scenario within the random utility discrete choice framework.

Following the random utility framework, every consumer faces a choice between increased purchase of locally grown ethnic greens and herbs due to concerns about food miles (dependent variable) and otherwise. The logit model was selected because of its asymptotic characteristics that constrain the predicted probabilities to a range of zero to one. Additionally, the logit model was favored given its mathematical simplicity and is often used in a setting where the dependent variable is binary. The estimation method utilizes the maximum likelihood estimation procedures (MLE) characterized as they provide consistent parameter estimates that are asymptotically efficient (Gujarati 1992; Pindyck and Rubinfeld 1991).

The relationship between dependent variable and socioeconomic characteristics was explored by modeling the indicator variable $Z_i$ for the $i^{th}$ consumer as a function of his/her socioeconomic and demographic characteristics as follows:

$$Z_i = \beta X_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \ldots + \beta_k x_{ik} + v_i, \quad i = 1, 2, \ldots, n$$

Where $x_{ij}$ denotes the $j^{th}$ socioeconomic and demographic attribute of the $i^{th}$ respondent, $\beta = (\beta_0, \beta_1, \ldots, \beta_k)$ was the parameter vector to be estimated and $v_i$ was the random error or disturbance term associated with the $i^{th}$ consumer. Under the logistic distributional assumption for the random term, the probability $P_i$ was expressed as:

$$P_i = F(Z_i) = F(\beta_0 + \sum_{j=1}^{k} \beta_j x_{ij}) = F(\beta X_i) = \frac{1}{1 + \exp(-\beta X_i)}$$

The estimated $\beta$-coefficients of equation (2) did not directly represent the marginal effects of the independent variables on the probability $P_i$. In the case of a continuous explanatory variable, the marginal effect of $x_j$ on the probability $P_i$ was given by:

$$\frac{\partial P_i}{\partial x_{ij}} = \left[ \beta_j \exp(-\beta X_i) \right] \left[ 1 + \exp(-\beta X_i) \right]^{-2}$$

However, if the explanatory variable is qualitative or discrete in nature, $\partial P_i / \partial x_{ij}$ does not exist. In such a case, the marginal effect is obtained by evaluating $P_i$ at alternative values of $x_{ij}$. For example, in the case of a binary explanatory variable $x_{ij}$ that takes values of 1 and 0, the marginal effect is determined as:

$$\frac{\partial P_i}{\partial x_{ij}} = P(x_{ij} = 1) - P(x_{ij} = 0)$$
The following empirical model is specified to capture the relationship between consumers’ socioeconomic and demographic variables and increased purchase of locally grown ethnic greens and herbs due to concerns about food miles.

The description, means, and standard deviation of explanatory variables are shown in Table 1 (see Appendix). The vector of explanatory variables in equation (2) included socioeconomic attributes of ethnic consumer as well as variables related to consumers’ demographic variables. The behavioral/perceptional and demographic attributes of ethnic consumers included were similar to a University of Guelph study exploring factors influencing the purchase intentions of Canadian consumers with respect to locally produced foods using likelihood method (Cranfield et al. 2008) and those included in a study of consumer response to state sponsored marketing programs: the case of New Jersey (Govindasamy et al. 1998) and those included in other analyses of consumer preferences for local products (Jekanowski et al. 2000). In addition, other consumer perceptions and behavioral attributes towards increased purchase of locally grown greens and herbs were also hypothesized to influence their choice. The following model was developed to predict characteristics of ethnic respondents increased purchases of locally grown ethnic greens and herbs because of concerns about food miles. The model framework and computed results were based on the LIMDEP Econometric Software (Econometric Software Inc. 2007).

\[
\text{FOOD\_MILES} = \beta_0 + \beta_1 \text{BUY\_ETH\_STORE} + \beta_2 \text{PROXIMITY} + \beta_3 \text{ETH\_EXP\_VISIT} + \beta_4 \text{LANG\_SPEAK} + \beta_5 \text{PACKG\_INFO} + \beta_6 \text{STRAGR\_QULTY} + \beta_7 \text{URBAN} + \beta_8 \text{YEARS\_CUR\_LOC} + \beta_9 \text{AGE17} + \beta_{10} \text{2Y\_COLG\_DEG} + \beta_{11} \text{4Y\_COLG\_DEG} + \beta_{12} \text{POST\_GRAD} + \beta_{13} \text{INC}>$200K + \beta_{14} \text{FEMALE} + \beta_{15} \text{INDIAN} + \beta_{16} \text{MEXICAN} + \beta_{17} \text{PUER\_RICAN}
\]

**Results**

Explanatory variables that were used in the logit model to predict which consumers have increased purchases of locally grown ethnic greens and herbs because of concerns about food miles are presented in Table 1. Among the explanatory variables, PROXIMITY, ETH_EXP_VISIT, YEARS_CUR_LOC, and AGE17 are continuous variables, and all remaining variables are defined as binary dummy variables. In Table 1, the continuous variables are explained in terms of average units and the binary dummy variables are explained in terms of percentage distribution. In total, 34% of ethnic consumers have increased purchases of locally grown ethnic greens and herbs because of concerns about food miles (FOOD_MILES) and the remaining 64% of them were not. Around 88% of respondents bought ethnic greens and herbs from ethnic stores (BUY_ETH_STORE) and 22% of them bought from typical American grocery stores, Community farmers’ markets, on-farm markets or road side stands, pick-your own (PYO) and other sources. The average distance from residence to the nearest ethnic grocery store was about 8.07 miles. On average, each respondent’s family spent (ETH_EXP_VISIT) about $23.85/per visit on ethnic greens and herbs. Around 31% of respondents felt that language the employees of the store speak is very important (LANG_SPEAK) when they purchase ethnic greens and herbs and 69% of them did not. About 43% of respondents felt that the information on the package is very
important (PACKG_INFO) when they purchase ethnic greens and herbs and 53% of them did not. Only 34% of respondents strongly agree in finding and purchasing ethnic greens and herbs that are the level of quality (SRTAGR_QULTY) that he/she expects and desire. No hypothesis was made towards behavioral and perceptual attitudes of ethnic consumers.

Table 1. Variables used to predict ethnic purchases of local herbs and greens

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Mean Units/ Percentage</th>
<th>Std. Dev. Units/%</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOOD_MILES</td>
<td>1 if the respondent increased purchases of locally grown ethnic greens and herbs because of concerns about food miles; 0=otherwise</td>
<td>34%</td>
<td>48%</td>
</tr>
<tr>
<td>BUY_ETH_STORE</td>
<td>1 if the respondent tend to buy ethnic greens and herbs from ethnic store; 0=otherwise</td>
<td>88%</td>
<td>32%</td>
</tr>
<tr>
<td>PROXIMITY</td>
<td>Distance to the nearest ethnic grocery store</td>
<td>8.07</td>
<td>15.89</td>
</tr>
<tr>
<td>ETH_EXP_VISIT</td>
<td>Average expenditure per visit on greens and herbs</td>
<td>$23.85</td>
<td>$13.54</td>
</tr>
<tr>
<td>LANG_SPEAK</td>
<td>1 if the respondent felt that language the employees of the store speak is very important when they purchase ethnic greens and herbs; 0=otherwise</td>
<td>31%</td>
<td>46%</td>
</tr>
<tr>
<td>PACKG_INFO</td>
<td>1 if the respondent felt that information on the package is very important when they purchase ethnic greens and herbs; 0=otherwise</td>
<td>43%</td>
<td>50%</td>
</tr>
<tr>
<td>STRAGR_QULTY</td>
<td>1 if the respondent strongly agree in finding and purchasing ethnic greens and herbs that are the level of quality that he/she expects and desire; 0=otherwise</td>
<td>34%</td>
<td>48%</td>
</tr>
<tr>
<td>URBAN</td>
<td>1 if the respondent resides in urban area; 0=otherwise</td>
<td>47%</td>
<td>50%</td>
</tr>
<tr>
<td>YEARS_CUR_LOC</td>
<td>Average number of years living at current location</td>
<td>13.18</td>
<td>10.90</td>
</tr>
<tr>
<td>AGE17</td>
<td>Average number of people at age 17 or younger in a household</td>
<td>1.21</td>
<td>1.31</td>
</tr>
<tr>
<td>2Y_COLG_DEG</td>
<td>1 if the respondent had 2 year college degree; 0=otherwise</td>
<td>9%</td>
<td>28%</td>
</tr>
<tr>
<td>4Y_COLG_DEG</td>
<td>1 if the respondent had 4 year college degree; 0=otherwise</td>
<td>18%</td>
<td>38%</td>
</tr>
<tr>
<td>POST_GRAD</td>
<td>1 if the respondent had post graduate or advanced degree; 0=otherwise</td>
<td>23%</td>
<td>42%</td>
</tr>
<tr>
<td>INC&gt;$200K</td>
<td>1 if the respondent household income had $200,000 or more</td>
<td>4%</td>
<td>19%</td>
</tr>
<tr>
<td>FEMALE</td>
<td>1 if the respondent gender was female; 0=otherwise</td>
<td>66%</td>
<td>47%</td>
</tr>
<tr>
<td>INDIAN</td>
<td>1 if the respondent was Asian Indian; 0=otherwise</td>
<td>24%</td>
<td>43%</td>
</tr>
<tr>
<td>MEXICAN</td>
<td>1 if the respondent was Mexican; 0=otherwise</td>
<td>25%</td>
<td>43%</td>
</tr>
<tr>
<td>PUER_RICAN</td>
<td>1 if the respondent was Puerto Rican; 0=otherwise</td>
<td>26%</td>
<td>44%</td>
</tr>
</tbody>
</table>

In terms of demographic characteristics, among respondents, 47% of them were residing in urban areas (URBAN). The average number of years living at current location (YEARS_CUR_LOC) was about 13.18 years. The average number of people at age 17 or younger (AGE17) in a respondent’s household reported was 1.21 persons. Among the respondents, 9% of them had an education of 2-year college degree (2Y_COLG_DEG), 18% of them had 4-years college degree (4Y_COLG_DEG) and 23% of them had post graduate or advanced degree (POST_GRAD). In terms of respondents annual household income, only 4% of them had income over $200,000 (INC>$200K). With respect to gender, 66% of females (FEMALE) and 44% of male were participated in this survey. Among the respondents, 24% of them were Asian Indians (INDIAN), 25% of them were Mexicans (MEXICAN), 26% of them were Puerto Ricans (PUER_RICAN), and 25% of them were Chinese. No priori expectations were made towards demographic characteristics of ethnic respondents.
Results from the logit model explain ethnic consumers’ increased purchases of locally grown ethnic greens and herbs due to food miles. The model correctly predicted the outcome of the dependent variable in 66.04% of total observations (Table 2). The chi-square statistics rejected the null hypothesis that the explanatory variables as a set were insignificant in explaining variations in the dependent variable at 0.001 level and the McFadden’s $R^2$ was 0.107. The $\chi^2$ value was 93.91 with 17 degrees of freedom.

**Table 2. Logit Model Predictive Accuracy**

<table>
<thead>
<tr>
<th>Actual Value</th>
<th>0</th>
<th>1</th>
<th>Correct Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>654 (59.00%)</td>
<td>73 (6.60%)</td>
<td>727 (65.60%)</td>
</tr>
<tr>
<td>1</td>
<td>299 (27.00%)</td>
<td>82 (7.40%)</td>
<td>381 (34.40%)</td>
</tr>
<tr>
<td>Total</td>
<td>953 (86.00%)</td>
<td>155 (14.00%)</td>
<td>1108 (100.00%)</td>
</tr>
</tbody>
</table>

Number of correct predictions: 736  
Percentage of correct predictions: 66.4%  
McFadden $R^2$: 0.07  
Chi squared: 93.91  
Degrees of freedom: 17  
P-value=0.80 with degrees of freedom = 8  
Overall Model Significance: 0.00

As the model results indicated (Table 3), BUY_ETH_STORE, PROXIMITY, LANG_SPEAK, PACKG_INFO, STRAGR_QULTY, POST_GRAD, INC>$200K and INDIAN variables are positively influencing on the increased purchases of locally grown ethnic greens and herbs due to food miles, whereas, URBAN, AGE17, and 4Y_COLG_DEG are negatively impacting on the increased purchases of locally grown ethnic greens and herbs due to food miles.

Since a limited literature exists in ethnic consumers produce study, the significant variables in this paper are compared with available general literature. As model results indicate in Table 3, among the respondents, those who tend to buy ethnic greens and herbs from ethnic stores (BUY_ETH_STORE) are 9% more likely to be willing to buy locally grown ethnic greens and herbs because of concerns about food miles compared to those who thought otherwise. In terms of proximity, those who travel more miles to the nearest ethnic grocery store are 0.03% more likely to be willing to buy locally grown ethnic greens and herbs due to concerns about food miles. Though the PROXIMITY variable is significant at 95% level but the impact on dependent variables is not economically significant. On average, each respondent is traveling about 8 miles to visit a grocery store (Table 1) and most of these ethnic populations are living in New Jersey, New York, Pennsylvania, Florida, Virginia, and Connecticut of eastern United States (U.S. Census 2000) and the majority of established ethnic grocery stores are near to these ethnic communities.
Table 3. Ethnic consumer increased purchases of locally grown ethnic greens and herbs because of concerns about food miles: Logit model estimates

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t-ratio</th>
<th>Probability</th>
<th>Marginal Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant***</td>
<td>-1.8711</td>
<td>0.3011</td>
<td>-6.22</td>
<td>0.0000</td>
<td>-0.41161***</td>
</tr>
<tr>
<td>BUY_ETH_STORE**</td>
<td>0.4537</td>
<td>0.2290</td>
<td>1.98</td>
<td>0.0476</td>
<td>0.0932**</td>
</tr>
<tr>
<td>PROXIMITY**</td>
<td>0.0014</td>
<td>0.0006</td>
<td>2.22</td>
<td>0.0266</td>
<td>0.0003**</td>
</tr>
<tr>
<td>ETH_EXP_VISIT</td>
<td>0.0002</td>
<td>0.0002</td>
<td>1.21</td>
<td>0.2278</td>
<td></td>
</tr>
<tr>
<td>LANG_SPEAK***</td>
<td>0.5069</td>
<td>0.1673</td>
<td>3.03</td>
<td>0.0025</td>
<td>0.11461***</td>
</tr>
<tr>
<td>PACKG_INFO***</td>
<td>0.5588</td>
<td>0.1425</td>
<td>3.92</td>
<td>0.0001</td>
<td>0.12401***</td>
</tr>
<tr>
<td>STRAGR_QULTY**</td>
<td>0.3108</td>
<td>0.1398</td>
<td>2.22</td>
<td>0.0262</td>
<td>0.0694**</td>
</tr>
<tr>
<td>URBAN*</td>
<td>-0.0019</td>
<td>0.0010</td>
<td>-1.80</td>
<td>0.0718</td>
<td>-0.00041*</td>
</tr>
<tr>
<td>YEARS_CUR_LOC</td>
<td>0.0014</td>
<td>0.0009</td>
<td>1.48</td>
<td>0.1385</td>
<td></td>
</tr>
<tr>
<td>AGE17**</td>
<td>-0.0014</td>
<td>0.0006</td>
<td>-2.24</td>
<td>0.0250</td>
<td>-0.00031**</td>
</tr>
<tr>
<td>2Y_COLG_DEG</td>
<td>-0.2766</td>
<td>0.1864</td>
<td>-1.48</td>
<td>0.1379</td>
<td></td>
</tr>
<tr>
<td>4Y_COLG_DEG**</td>
<td>-0.3254</td>
<td>0.1490</td>
<td>-2.18</td>
<td>0.0290</td>
<td>-0.07157**</td>
</tr>
<tr>
<td>POST_GRAD***</td>
<td>0.6033</td>
<td>0.1418</td>
<td>4.25</td>
<td>0.0000</td>
<td>0.13272***</td>
</tr>
<tr>
<td>INC&gt;$200K***</td>
<td>0.0005</td>
<td>0.0002</td>
<td>2.54</td>
<td>0.0112</td>
<td>0.00012***</td>
</tr>
<tr>
<td>FEMALE</td>
<td>0.2194</td>
<td>0.1443</td>
<td>1.52</td>
<td>0.1283</td>
<td></td>
</tr>
<tr>
<td>INDIAN**</td>
<td>0.3811</td>
<td>0.1937</td>
<td>1.97</td>
<td>0.0491</td>
<td>0.08636**</td>
</tr>
<tr>
<td>MEXICAN</td>
<td>0.2732</td>
<td>0.2210</td>
<td>1.24</td>
<td>0.2162</td>
<td></td>
</tr>
<tr>
<td>PUER_RICAN</td>
<td>0.0735</td>
<td>0.2176</td>
<td>0.34</td>
<td>0.7356</td>
<td></td>
</tr>
</tbody>
</table>

*** Significant at 1%; **Significant at 5%; * Significant at 10%

Respondents who felt that the language the employees of the store speak is very important (LANG_SPEAK) are 11.5% more likely to be willing to buy locally grown ethnic greens and herbs because of food miles compared to those who thought otherwise. Since some of ethnic immigrants may not speak or understand English, these consumers would like to speak with customer service representative who speaks the same ethnic language. With respect to information on package, those who felt that the information on the package is very important (PACKG_INFO) when they purchase ethnic greens and herbs are 12% more likely to be willing to buy locally grown ethnic greens and herbs due to concerns about food miles compared to those who thought that the information on the package is not very important. In terms of level of produce quality, those who strongly agree in finding and purchasing ethnic greens and herbs that are the level of quality that they expect and desire (STRAGR_QULTY) are about 7% more likely to be willing to buy locally grown ethnic greens and herbs because of food miles compared to those who thought otherwise.

In the case of demographic variables, among respondents, those who had post-graduate or advanced degree (POST_GRAD) are 13.3% more likely to be willing to buy locally grown ethnic greens and herbs due to concerns about food miles compared to those who had up to high school education. Those who had income over $200,000 (INC>$200K ) are 0.01% more likely to be willing to buy locally grown ethnic greens and herbs because of concerns about food miles compared to those had income less than $200,000. The variable INC>$200K is also similar to PROXIMITY and the impact on dependent variable is not sizable. Similar results were also
found while studying willingness to buy locally grown ethnic produce items in east-coast US (Puduri and Govindasamy 2011). According to that study results, Asian ethnic consumers those had income over $200,000 were 0.01% more likely to be willing to buy locally grown ethnic produce items. Another Hispanic ethnic study was also found that those had less household income were less likely to be associated with willingness to buy locally grown produce (Govindasamy and Puduri 2011). It indicates that higher income is somewhat associated with willingness to buy locally grown produce compared to lower household income levels. Willingness to buy locally grown products increased with income in Indiana (Jekanowski et al. 2000). With respect to education and income levels, similar attitude found by other studies (Brooker and Eastwood 1989: Eastwood et al. 199; Govindasamy et al. 1998) in which general consumers were local food patrons and were more educated and earning above average income. In the case of ethnic dummy variable, Asian Indian (INDIAN) respondents are 8.6% more likely to be willing to buy locally grown ethnic greens and herbs because of concerns about food miles compared to Chinese respondents. The other ethnicities such as Mexicans and Puerto Ricans are not significant in this model.

Furthermore, respondents who live in urban areas (URBAN) are 0.04% less likely to be willing to buy locally grown ethnic greens and herbs due to concerns about food miles compared to those who live in suburban and rural areas. Southeast Missouri rural residents were also more willing to seek out local products than urban residents (Brown 2009). On the contrary, Patterson et al. (1999) discovered that the Phoenix metro area were more likely to prefer locally grown products. Respondents had more people at 17 or younger (AGE17) in their family are 0.03% less likely to be willing to buy locally grown ethnic greens and herbs due to concerns about food miles compared to those had fewer number of people at 17 or younger. Those who had four years college degree (4Y_COLG_DEG) are 7% less likely to be willing to buy locally grown ethnic greens and herbs due to concerns about food miles compared to those who had up to high school education.

**Summary**

Locally grown ethnic greens and herbs help reduce food miles and provide fresh produce to the local ethnic consumers while saving fuel costs. As the survey results indicated, 34% of ethnic consumers have increased purchases of locally grown ethnic greens and herbs because of concerns about food miles. As model results indicated, among respondents, those who tend to buy ethnic greens and herbs from ethnic stores, those who travel more miles to the nearest ethnic grocery store, those who felt that language the employees of the store speak is very important, those who felt that the information on the package is very important when they purchase ethnic greens and herbs, those who strongly agree in finding and purchasing ethnic greens and herbs that are the level of quality that they expect and desire, those who had post-graduate or advanced degree, those who had income over $200,000, and Asian Indians are more likely to be willing to buy locally grown ethnic greens and herbs because of concerns about food miles, whereas, those who lives in urban areas, those households have more number of people at 17 or younger, those who had four years college degree are less likely to be willing to buy locally grown ethnic greens and herbs because of concerns about food miles. These results may be useful to the local farmers in growing possible ethnic greens and herbs based on the demand and target markets.
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