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**Sustainable Consumer Groups and Their Willingness to Pay for  
Tangible and Intangible Attributes of Fresh Strawberries**

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## Introduction

The U.S. fresh strawberry market has been increasing for decades. In 2014, fresh strawberry production, which amounted to 30.2 billion pounds valued at \$2.6 billion, accounted for 81 percent of total strawberry production in the U.S. (USDA, NASS, 2015). Per capita fresh strawberry use has also trended higher since 1980. In 2013, U.S. use of fresh strawberries reached a record 7.9 pounds per capita (Figure1), in response to greater awareness of the importance of healthy diets, increased year-round availability through domestic production and imports, and adoption of improved varieties (USDA, ERS, 2015).

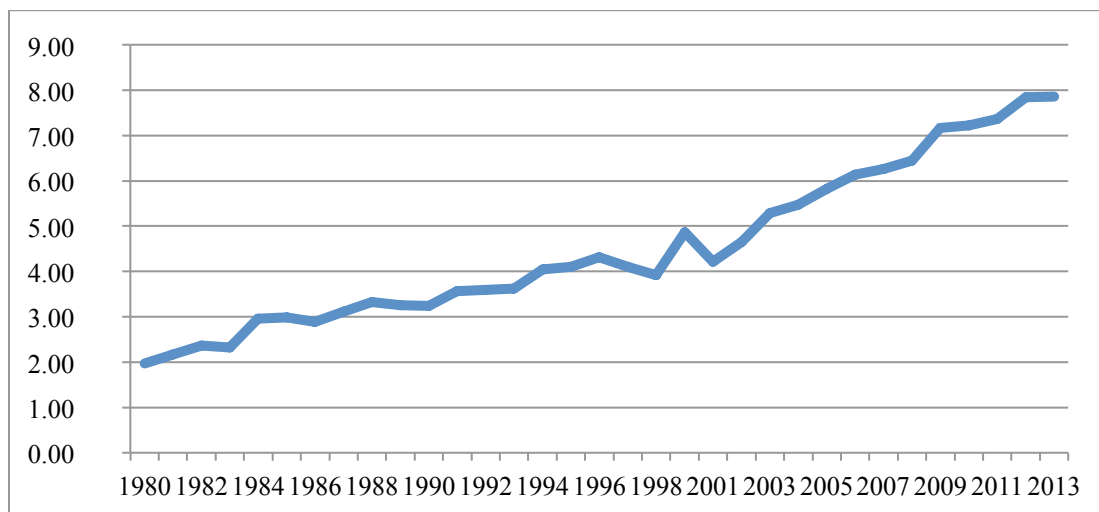


Figure 1: U.S. Fresh Strawberry Per Capita Consumption 1980-2013 (Unit: pounds) (Source: USDA, Economic Research Service, Fruits and Trees Nut Yearbook, Spreadsheet Files.)

With this enhanced awareness of healthy eating habits, U.S. consumers are no longer satisfied solely by purely physical characteristics like size, color, and shape when purchasing strawberries. This is not to say that such considerations have become unimportant to consumers, but rather that they now pay more attention to other more intangible attributes, such as nutritional considerations, or whether the strawberries were produced using non-chemical methods or less fertilizer, to name a few. In addition, social justice and environmental concerns have also come to play an increasingly important role when consumers make purchase decisions.

Consumers can be classified into different groups by their purchasing habits and behaviors (namely, farmer's market, local food, organic food, and community-supported agriculture consumers), which in turn are related to their preferences for different types of fresh strawberries. Strawberries are classified as organic, locally produced, naturally grown, or conventional (also known as GMO-free). Finally, fresh strawberries could also be classified according to their methods of production or trading procedures, such as whether the strawberries were produced in an environmentally friendly fashion, used little or no pesticides, were fairly traded, etc. For each of these three methods of classification, participants were asked about their preference and willingness to pay (WTP) for each kind of fresh strawberry with different characteristics.

The objective of this project is to have a better understanding of U.S. consumers' consumption, perception, preference, and WTP for different kinds of strawberries. The analysis of the survey data helps us gain some useful insights into the current U.S. fresh strawberry market, especially concerning consumers' perspectives on and WTP for fresh strawberries. More specifically, the objectives of this survey include:

1. Identify different groups of consumers (in particular, farmer's market, local food, organic food, and community-supported agriculture consumers).
2. Estimate their preferences for different traits of strawberries (freshness, safety, nutritional value, impact on environment, etc).
3. Determine their WTP for these traits based on their perceptions of different labels (i.e., organic, locally produced, eco-friendly, GMO-free, etc).

### **Data Collection and Demographics of Survey Participants**

This survey was conducted in 50 states across the country, using an online survey. In the end, 825 valid observations were collected and eligible for statistical analysis. Among all participants, 47.9% were male and 52.1% were female. In term of age distribution, the participants in the sample were roughly evenly distributed between the ages of 18 and 69. Young (under the age of 35), middle aged (from the age 35 to 59), and senior (above the

age of 59) participants account for 44.8%, 30.8%, and 24.4% of the sample, respectively. In term of race distribution, most of the participants were Caucasian (76.6%), followed by Hispanic (11.2%), Black or African American (9.1%), and others (3.2%).

With respect to the participants' occupations, most of the participants had a full time job (36.1%), followed by participants who are retired (21.6%). Homemakers (12.8%), participants with part-time jobs (11.4%), and students (11.4%) ranked as the next three groups. Only 6.4% of participants were unemployed. In terms of education, participants with a bachelor's degree or post-graduate degree made up to 39% of the total sample. Participants with some other level of college degree make up 38.1% of the sample, while only 22.9% had a high school degree or below. These figures suggest that the participants in our sample were relatively highly educated, since over three-quarters of them (77.1%) had some college-level degree.

Regarding income, 19.8% of the participants had a household annual income falling in the range from \$50,000 to \$74,999, larger than any other single group in the sample. The rest split among other income ranges, including \$15,000-\$24,999 (9%), \$25,000-\$34,999 (13.3%), \$35,000-\$49,999 (14.2%), and \$75,000-\$99,999 (14.1%). Noticeably, 11.8% of the people surveyed had an annual household income of less than \$14,999, while about 5.8% had a relatively high annual income of over \$150,000.

In terms of the distribution of weekly food expenditures, most (28.2%) of the families reported spending \$100 to \$149 on food per week, followed by families with an expenditure of \$50 to \$99 per week (26.8%), and then by families spending \$150-\$199 per week (16.0%). For other households, 8% reported spending less than \$49 per week on food. Only a few families (about 6.1%) spend over \$349 on food per week, consistent with the proportion of relatively high-income families in the survey (5.8%).

### **Consumer Group Identification and Evaluation of Consumers' Preferences for Fresh Strawberries**

Consumers are classified into different groups based on their average weekly food expenditures on different products. For example, if a participant's average weekly expenditure on organic food is greater than zero, then this participant is considered as an

organic food consumer; otherwise, he or she is a non-organic food consumer. We are primarily interested in four consumer groups: local, farmer's market, community supported agriculture (CSA), and organic food consumers. In this survey, as Figure 2 shows, the majority of participants are local food consumers (664), followed by organic food (514), farmer's market food (505), and CSA food consumers (371).

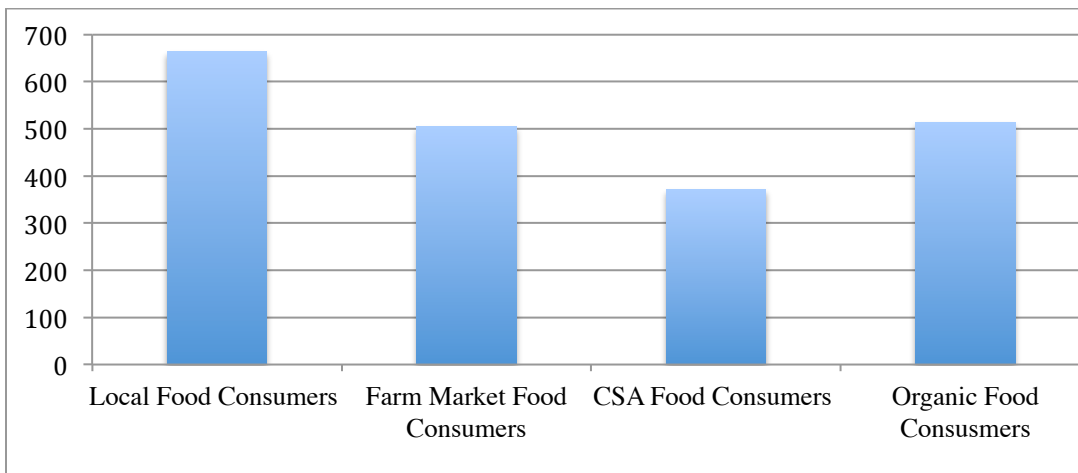


Figure 2: The Number of Consumers in Each Group

Consumers' attitudes towards the importance of an attribute for fresh strawberries are measured on a scale from one to five: a one indicates that the attribute is not important at all, whereas a five indicates that the attribute is very important. Figure 3 shows the local and non-local consumers' preferences toward the tangible attributes of fresh strawberries. Container size, origin of production, shape, aroma, variety, and brand are considered to be more important by local than by non-local food consumers.

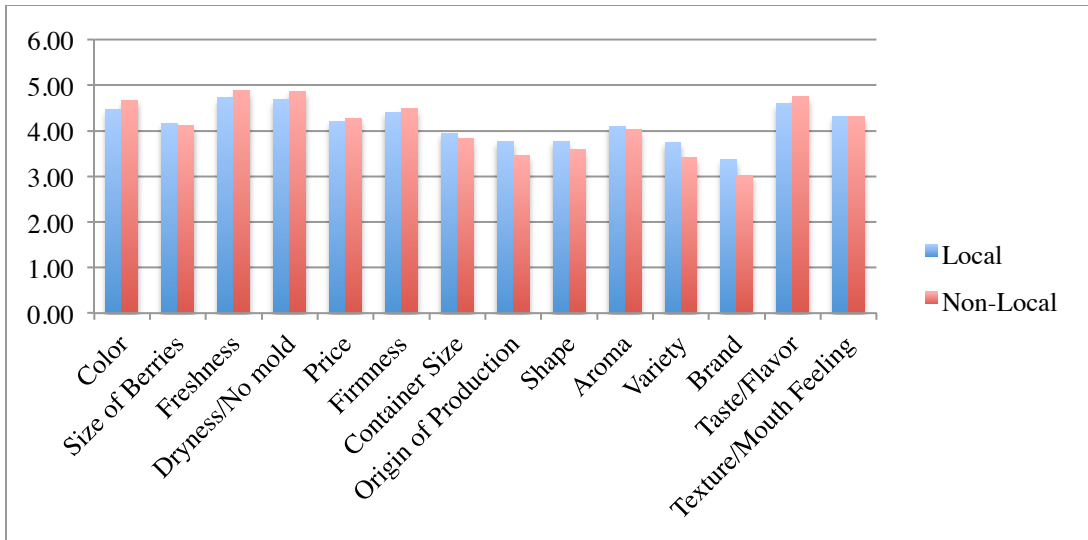


Figure 3: Local and Non-Local Consumers' Preferences regarding Tangible Attributes of Fresh Strawberries

Intangible attributes, in general, are considered less important than tangible attributes by both local and non-local food consumers, as Figure 4 shows. The salient fact, however, is that all intangible attributes are considered to be more important by local than by non-local food consumers. This is especially true for some attributes in particular, such as whether strawberries are locally produced, whether they are organic, and whether less fertilizer is used in their production. Local consumers tend to give these attributes an importance rating that is, on average, 0.6 higher than the ratings given to those attributes by non-local consumers. This suggests that local food consumers are generally more concerned about the intangible attributes of the food they buy than non-local food consumers are.

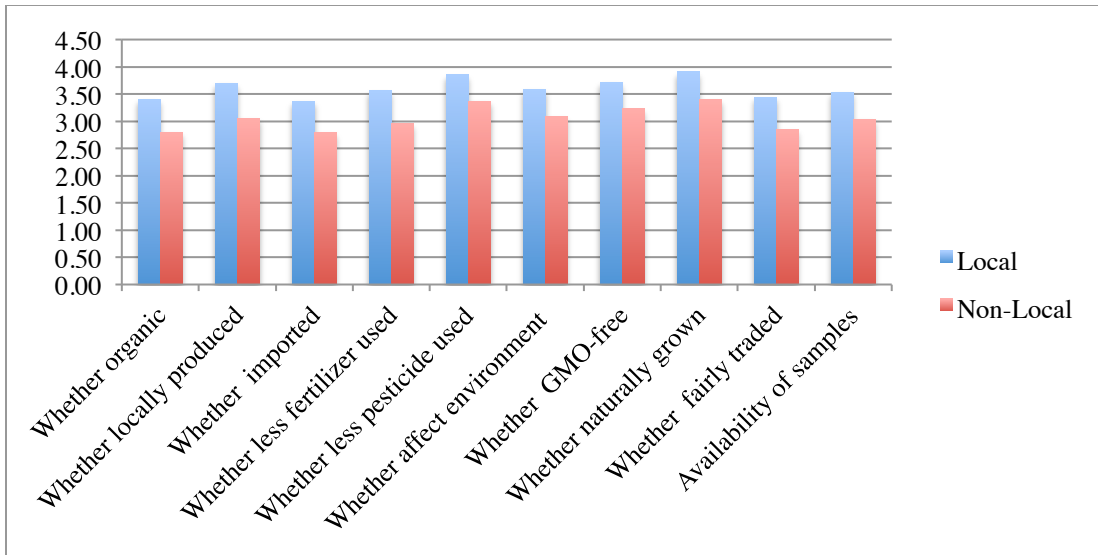


Figure 4: Local and Non-Local Consumers' Preferences regarding Intangible Attributes of Fresh Strawberries

Turning to farmer's market consumers, we find that the container size, origin of production, shape, aroma, variety, and brand of fresh strawberries are all considered to be more important by farmer's market consumers than by non-farmer's market consumers (Figure 5). These results are similar to those in the case of local and nonlocal consumers, although in the case of two particular attributes (origin of production and brand), the difference in rating between farmer's and non-farmer's market consumers is larger than that between local and non-local food consumers.

In a more significant contrast, all intangible attributes were rated as more important by farmer's market consumers than by non-farmer's market consumers (Figure 6). Significant differences exist for three attributes in particular: whether the strawberries are organic; whether they are imported; and whether less fertilizer is used. This result indicates that farmer's market consumers, like local food consumers, care more about the origin of production, organic products, and fertilizer usages.



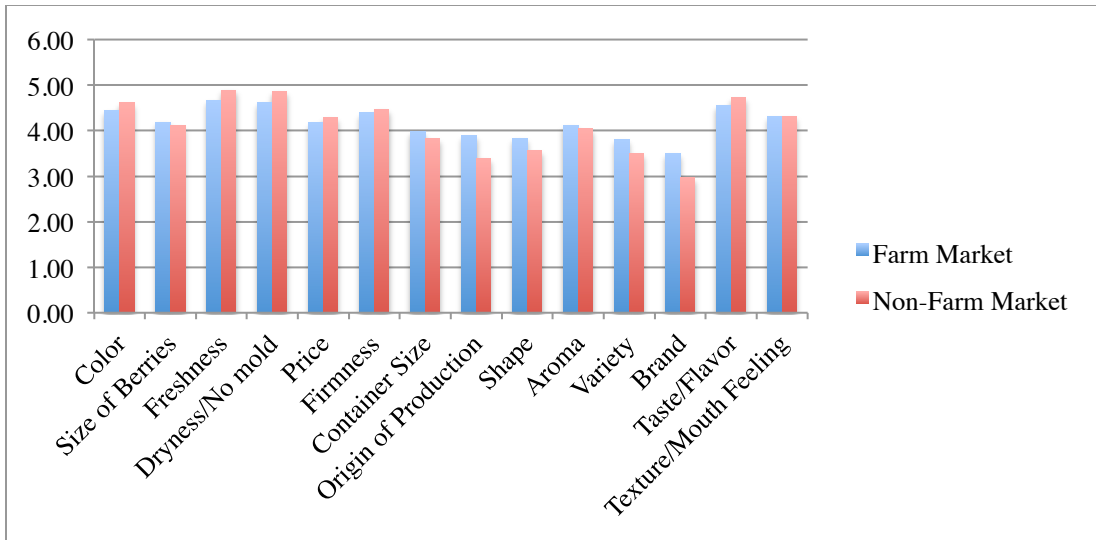


Figure 5: Farmer’s market and Non-Farmer’s market Consumers’ Preferences regarding Tangible Attributes of Fresh Strawberries

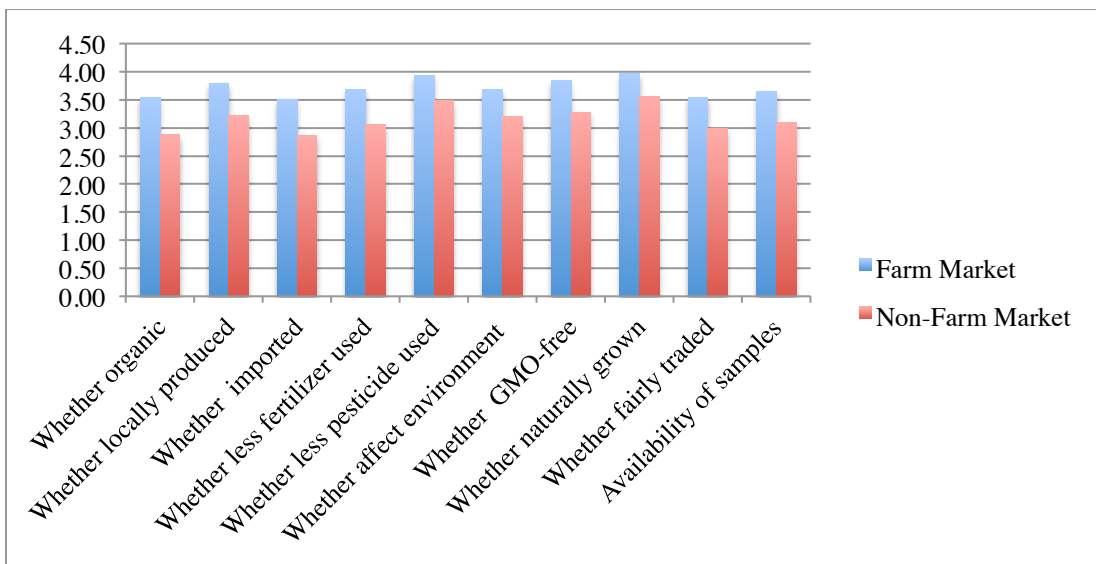


Figure 6: Farmer’s market and Non-Farmer’s market Consumers’ Preferences regarding Intangible Attributes of Fresh Strawberries

Both organic and non-organic food consumers evaluate the importance of tangible attributes similarly, although the container size, origin of production, shape, variety, and brand are all slightly more important for organic food consumers than for non-organic food consumers (Figure 7); among these attributes, the importance of the origin of production is valued most differently between the two consumer groups.

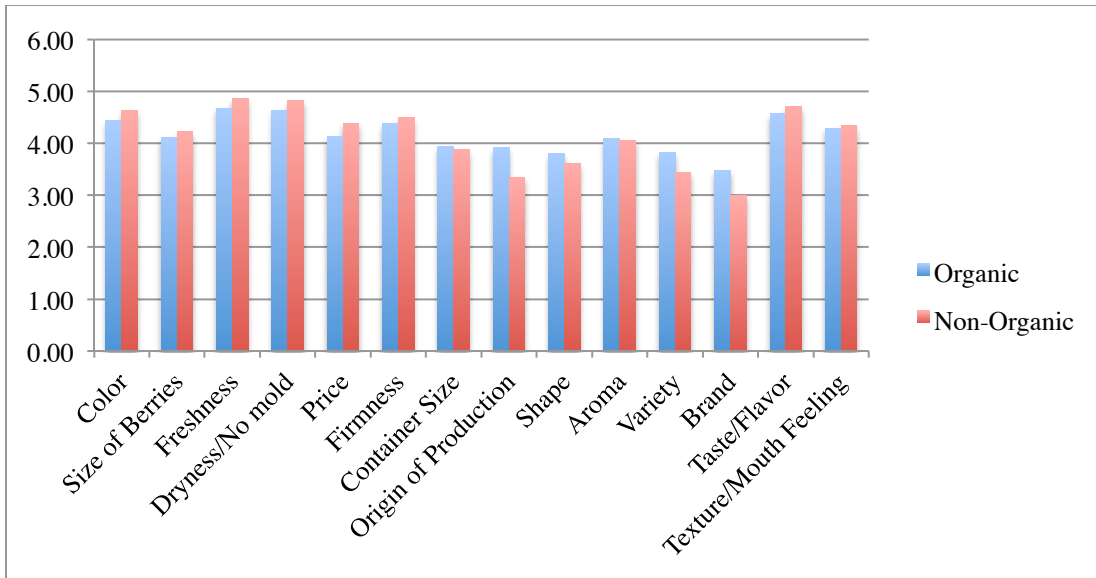


Figure 7: Organic and Non-Organic Consumers' Preferences of Tangible Attributes of Fresh Strawberries

The differences between organic and non-organic food consumers' attitudes towards intangible attributes are greater than their differences regarding tangible attributes (Figure 8). Not surprisingly, organic food consumers believe that being organic is a much more important attribute than non-organic food consumers do. In addition, other intangible attributes, such as the presence of GMOs, or fertilizer and pesticide usages, concern organic food consumers much more than non-organic food consumers.

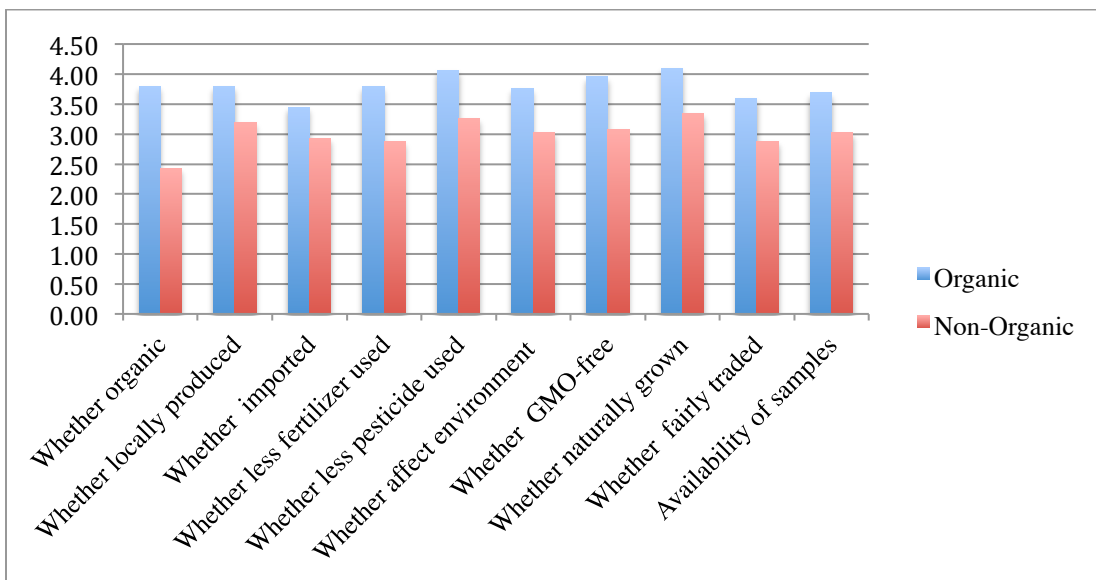


Figure 8: Organic and Non-Organic Food Consumers' Preferences of Intangible Attributes of Fresh Strawberries

Community Support Agriculture (CSA) refers to a particular network or association of individuals who have pledged to support one or more local farms, with growers and consumers sharing the risks and benefits of food production. CSA members or consumers pay at the onset of the growing season for a share of the anticipated harvest; once harvesting begins, they periodically receive shares of the produce.

In terms of tangible attributes when buying strawberries, CSA consumers are more concerned about container size, origin of production, shape, variety, and brand than non-CSA consumers (Figure 9). In terms of intangible attributes, like other pairs of consumer groups, CSA consumers consider intangible attributes more important than non-CSA consumers do (Figure 10). This is especially true for the following attributes: whether the strawberries are organic; whether they are imported; and whether their trade is fair and contributes to social justice.

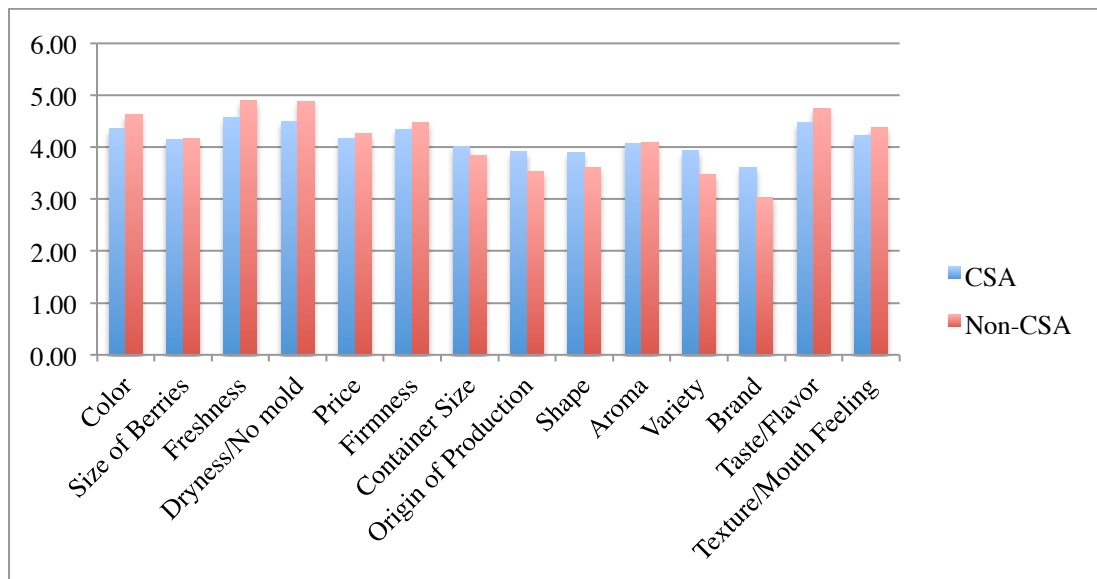


Figure 9: CSA and Non-CSA Food Consumers' Preferences regarding Tangible Attributes of Fresh Strawberries

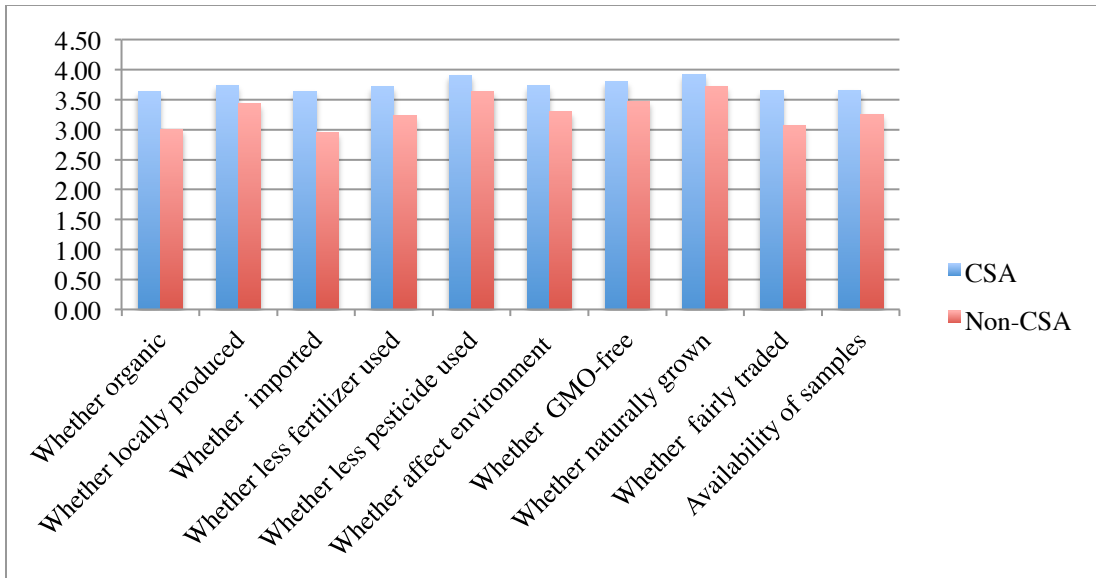


Figure 10: CSA and Non-CSA Food Consumers' Preferences regarding Intangible Attributes of Fresh Strawberries

### Consumers' WTP for Different Attributes of Fresh Strawberries

In this section, we summarize consumers' WTP for different attributes of fresh strawberries. In the survey, participants were asked to select additional willingness to pay for labels that address different attributes of fresh strawberries. In other words, participants were asked how much more they would be willing to pay for strawberries with a particular label, given that everything else about those strawberries was kept the same. Both local and non-local food consumers were willing to pay more for the organic, local, and non-GMO attributes than for others attributes (Figure 11). Local food consumers, however, are willing to pay more than non-local food consumers for all of these attributes. For example, on average, local food consumers are willing to pay an additional 0.82 dollars for organic strawberries, while non-local food consumer are only willing to pay additional \$0.44 for organic strawberries.

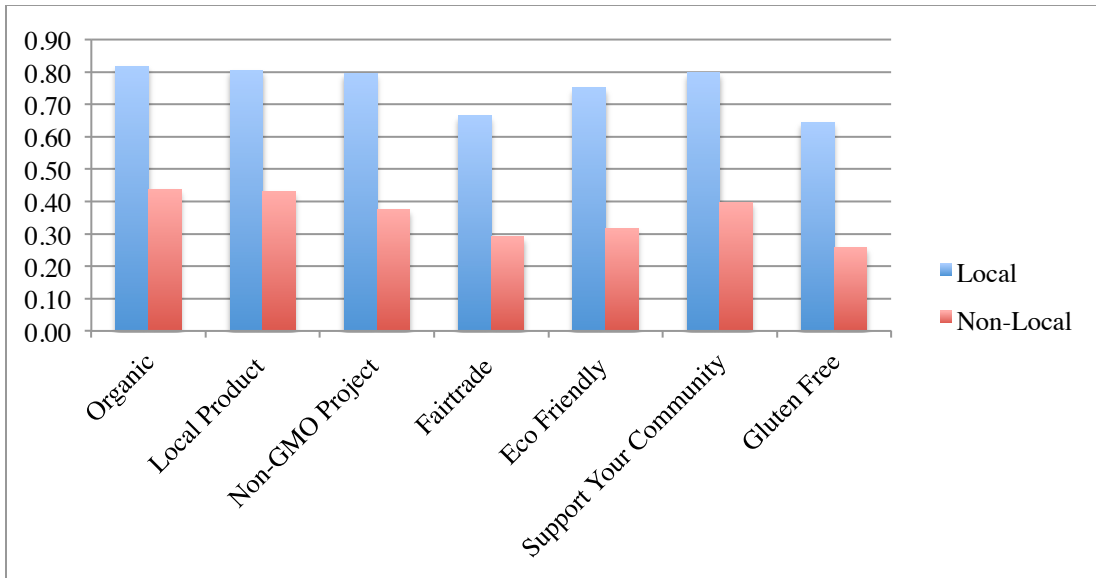


Figure 11: Local and Non-Local Food Consumers' WTP for Attributes of Fresh Strawberries

For farmer's market and non-farmer's market consumers (Figure 12), the attribute for which they were both willing to pay the most was that of being organic (\$0.89 for farmer's market consumers and \$0.51 for non-farmer's market consumers). This was followed by the willingness to pay more for local products (\$0.87 for farmer's market consumers and \$0.51 for non-farmer's market consumers), and non-GMO products (\$0.87 for farmer's market and \$0.47 for non-farmer's market consumers). Both groups' WTP was the least for gluten-free strawberries (\$0.73 for farmer's market and \$0.31 for non-farmer's market consumers).

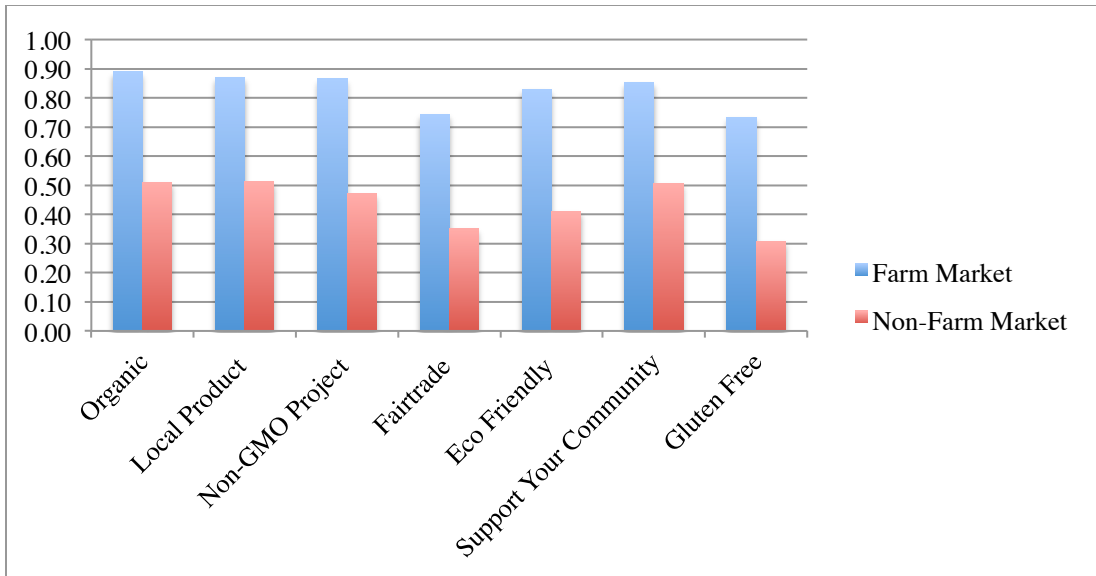


Figure 12: Farmer's Market and Non-Farmer's Market Consumers' WTP for Attributes of Fresh Strawberries

Organic food consumers (Figure 13), not surprisingly, were willing to pay the most for the organic attribute (\$0.97); their WTP was the least for the attribute of being gluten-free (\$0.74). By contrast, non-organic food consumers were willing to pay most for locally produced strawberries (\$0.46) and least for gluten-free strawberries (\$0.29). As with the other consumer groups, organic food consumers, on average, were willing to pay more for each of the attributes than non-organic food consumers were.

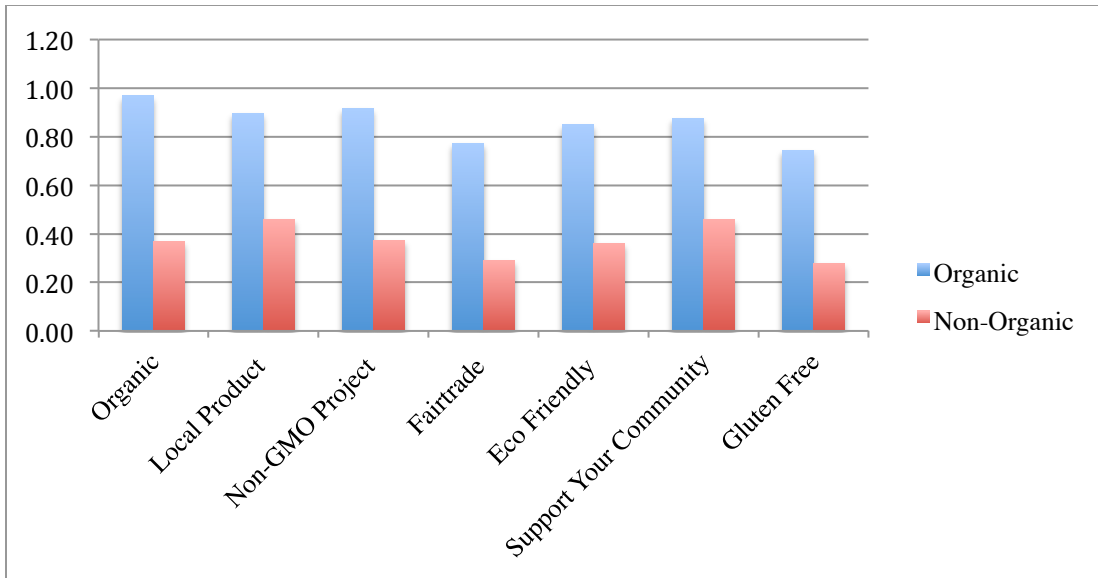


Figure 13: Organic and Non-Organic Consumers' WTP for Attributes of Fresh Strawberries

CSA consumers had the highest WTP of the consumer groups studied, as they were willing to pay \$0.9 or more for each of the attributes presented in the survey (Figure 14).”The attribute they were willing to pay the most for was that of being organic (\$1), followed by being eco-friendly (\$0.98), a local product (\$0.97), and non-GMO (\$0.97). By contrast, non-CSA consumers all had WTPs below \$0.6. They were willing to pay the most for organic and local products (both \$0.53), and the least for gluten-free products (\$0.29).

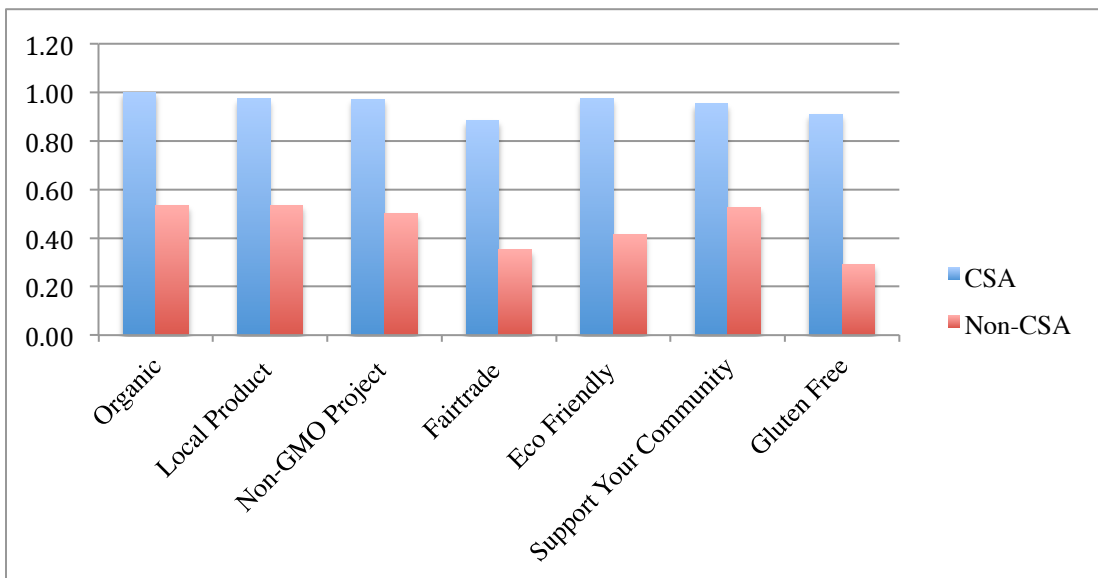


Figure 14: CSA and Non-CSA Food Consumers' WTP for Attributes of Fresh Strawberries

Across all three consumer groups, CSA consumers had the highest WTP for all attributes, followed by organic, farmer’s market, and local food consumers, in that order (Figure 15). This finding is salient, because it indicates that CSA consumers are most concerned about the sorts of intangible attributes discussed above, and are likely to pay significantly more for those attributes, whereas local food consumers are the least concerned with these attributes and are less likely to pay more for them. In addition, these results also suggest that organic and farmer’s market consumers have roughly the same WTP for environmentally friendly and gluten-free attributes.

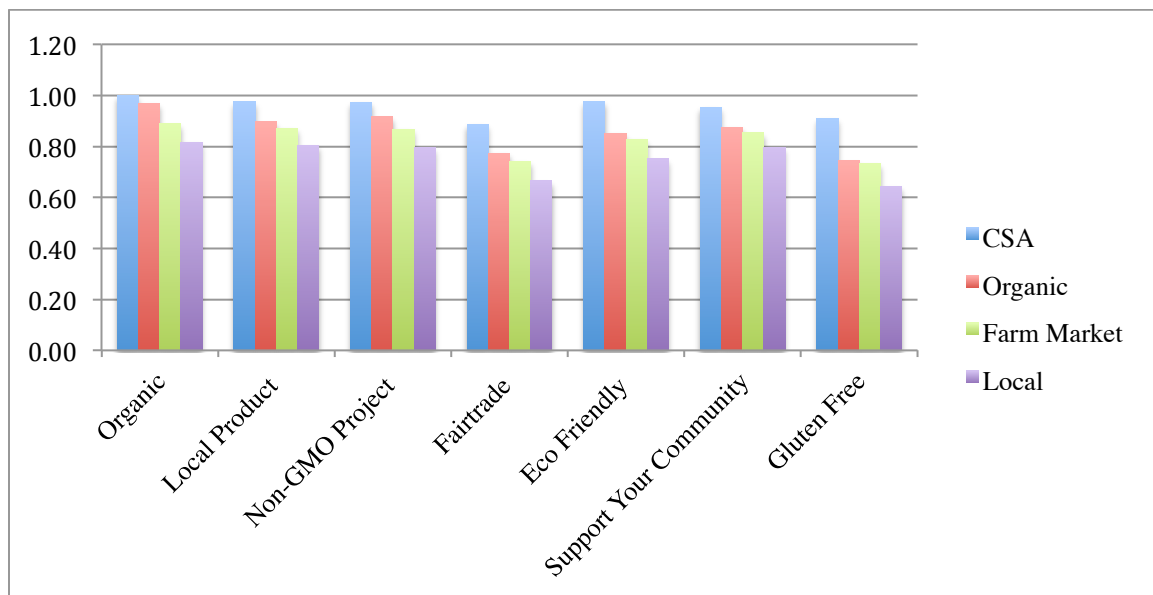


Figure 15: CSA, Organic, Farmer’s Market, and Local Food Consumers’ WTP for Attributes of Fresh Strawberries

## Conclusion

This report presents the results of a survey of different groups of U.S. consumers, regarding their purchasing behavior, preferences, and WTP for strawberries with different tangible and intangible attributes. The general conclusions drawn from this report are listed below:

- 1) Among the consumer groups surveyed, preferences for tangible attributes are similar, although container size, origin of production, shape, aroma, variety, and brand are generally considered to be more important by local, farmer’s market, organic, and



CSA consumers than by non-local, non-farmer's market, non-organic, and non-CSA consumers.

- 2) Unlike tangible attributes, intangible attributes can be applied to identify consumer groups, because their opinions on the importance of those intangible attributes varies greatly depending on the groups they belong to.
- 3) Local, farmer's market, organic, and CSA consumers are willing to pay more for all attributes than non-local, non-farmer's market, non-organic, and non-CSA consumers are.
- 4) In general, consumers are willing to pay the most for the organic attribute, while they are willing to pay the least for the gluten-free attribute.
- 5) The highest average WTP for any specific attribute is not greater than \$1. Given that the average paid price for strawberries is \$2.7 per pound in the survey, the highest WTP for a specific attribute is roughly around 1/3 of its retail price.
- 6) Among all consumer groups surveyed, CSA consumers have the highest, while local food consumers have the lowest, WTP for all of the attributes considered.

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