COST, QUALITY, AND AVAILABILITY: COMPARING WINTER PRODUCE IN SUPERMARKETS AND FARMERS MARKETS

University of Washington, Seattle | Nutritional Sciences Program

March 2016

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ACKNOWLEDGEMENTS

We would like to thank our Public Health Nutrition instructors, Mary Podrabsky and Dr. Scott Ickes, for securing this project and laying the groundwork for its completion. Their support, guidance, and expertise were integral to the success of this project. This project was made possible by Bridget Igoe with the Washington State Department of Health, whose work secured federal funding for the Food Insecurity Nutrition Incentive (FINI) Program in an effort to make nutritious foods more accessible. We would also like to thank all of the FINI stakeholders and implementing partners for their role in helping to make Washington State residents healthier. We would also like to thank the Supermarkets and Farmers Markets that willingly devoted their time to answering research questions and helping us to gather pertinent data. Lastly, we would like to thank the University of Washington Nutritional Sciences Program for allowing this project as part of the curriculum.

TEAM MEMBERS

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EXECUTIVE SUMMARY

OBJECTIVE:

The primary aim of this project was to inform the development of policies and practices to promote the purchase of fruits and vegetables by Supplemental Nutrition Assistance Program (SNAP) participants.

METHODS:

A data collection tool was created to analyze variety, pricing, appearance, and merchandising for comparable fresh, canned, and frozen produce in farmers markets (FM) and supermarkets (SM). Data was only collected for the nine most popular winter produce items in Washington State: apples, pears, potatoes, onions, carrots, mushrooms, squash, kale, and collard greens.

Preliminary FM and SM surveying was conducted to confirm produce availability and varieties. The scope of data collection was narrowed to the most common, least expensive, and most expensive varieties for each produce item. After data collection was completed, all data was entered into a standardized Microsoft Excel Workbook. FM and SM data were aggregated in separate worksheets in order to analyze the FM- and SM-specific findings for comparison.

Key informant interviews were also conducted with SM produce managers to assess the SM produce managers' perception of fruit and vegetable cost, availability, and clientele purchasing power. Interviews were analyzed to identify common themes, patterns, and trends.

RESULTS:

In total, four FMs and nine SMs were surveyed. The FMs were located in Ballard, West Seattle, Capitol Hill, or U-District, and the SMs were within a two-mile radius of the FMs. SM F&V tended to be less expensive than FM produce, though pricing was more similar for organic items. On average, SMs offered a greater variety of conventional fresh F&V than FMs, but the variety of organic fresh F&V were comparable between SMs and FMs. Though FMs offered more local produce than SMs, the appearance of these F&V was occasionally not as good as the near perfect SM produce. In addition, canned and frozen F&V were usually more expensive than fresh F&V at SMs.

Retail produce managers expressed that F&V availability was largely driven by consumer demands and that they felt consumers placed value on price, seasonality, quality, and specialized (i.e. local or organic) fruits and vegetables. These values influenced consumer purchasing patterns and retail marketing strategies.

RECOMMENDATIONS:

- Consider expanding FINI incentives to include more supermarket, superstores, discount grocery stores especially low-cost retailers.
- Promote purchase of frozen F&V given that these foods are convenient, have a longer shelf-life and limited additives.
- Provide in-store labeling and signage around incentive-eligible items and consider expanding educational opportunities that promote increased F&V purchases and cooking.
- Increase visibility of EBT-acceptance signs and SNAP-friendly marketing strategies at FM for greater recognition among participants.

CONCLUSION:

It would be beneficial to replicate this study in other seasons (Spring, Summer, or Fall) to compare pricing and seasonality. Future research could focus on price analysis of fresh versus frozen to consider bulk, sale, and vendor-based loyalty pricing, as well as food scrap weight. Future studies could also look beyond cost measures, including convenience, taste, and social perceptions.

INTRODUCTION

Overview

Though the importance of eating a healthy diet has long been established, adequate fruit and vegetable (F&V) consumption continues to be a challenge among low-income households, especially among participants in the Supplemental Nutrition Assistance Program (SNAP).[1] Research suggests SNAP participants may perceive F&V as too expensive and inconvenient.[1,2] In addition, SNAP participants are less likely to believe that dietary changes improve health outcomes.[1]

In an effort to address these issues, the Washington State Department of Health (the Washington DoH) was recently awarded a $5.86 million, four-year grant by the United States Department of Agriculture (USDA) for the Food Insecurity Nutrition Incentive (FINI) program. This program exists to promote F&V purchases by SNAP participants in order to improve their nutritional status. Working in collaboration with state and local agencies, supermarkets (SMs), and farmers markets (FMs), the program offers a variety of cash-value F&V incentives at the point-of-sale in FMs and SMs. Qualifying F&V will include fresh, canned or frozen items that have no added fats, sugars, or salt.

Given that cost and convenience are major factors influencing SNAP participant shopping behaviors, FINI program planners at the Washington DoH Healthy Eating Active Living (HEAL) Program are interested in studying how these factors vary across FMs and SMs, the two types of retail outlets participating in FINI. Cost is of particular concern, as FMs are often perceived to be more expensive than SMs.[2] Research has shown that the cost of F&V at FMs often are similar or less expensive than SMs.[3] The Washington DoH is also interested in gaining a better understanding of the actual differences in quality and availability of produce between FMs and SMs in Washington State and the extent to which each supports local farmers, if at all.

Statement of Purpose

The purpose of this project was to gain a better understanding of the actual differences in cost, quality, and availability of produce between FMs and SMs in Seattle, WA – a major site for FINI activities – to inform the development of policies and practices that promote the purchase of F&V by SNAP participants.

Project Goals

- Complete a literature review summarizing the factors that influence produce purchasing patterns and venue choices among SNAP participants and pricing of F&V in SMs and FMs.
- Assess and evaluate the quality and cost of comparable produce items (fresh, frozen and canned) available at SMs and FMs during winter months.
- Describe the differences in variety and source location of winter produce in SMs and FMs.
- Describe the differences in environmental factors that may affect purchasing patterns at FMs and SMs, including: merchandizing strategies, retail hours, and accessibility.
- Make evidence-based policy, system, and environmental recommendations to increase F&V purchasing patterns among SNAP participants that address common perceptions, behaviors, and environmental factors.

METHODS

Literature Review

Graduate student researchers with the University of Washington conducted a literature review summarizing the factors that influence produce purchasing patterns among SNAP participants and pricing of F&V in SMs and FMs. The literature review was conducted by two teams: the provider team researching SM and FM strategies for sales, and the customer team researching purchasing behaviors of low-income customers. These teams conducted separate searches and consolidated their findings.

Each review was conducted in two phases: phase 1 was the initial review, while phase 2 focused on filling in research gaps. Each resource was selected by the researchers between January 5, 2016 and January 18, 2016. These findings and resources are presented by source in Table 1 and 2 of the Appendix. Each team's methods are described below.

Provider team

Researchers conducted a broad initial literature review on the determinants of produce pricing and availability at FMs and SMs using the University of Washington's library article search, PubMed, Google Scholar, and Google search. Key search terms included: "produce quality," "fruit and vegetable quality," "market baskets," "farmers market pricing," "fruit and vegetable seasonality," "fruit and vegetable marketing," and "supermarket pricing." This search focused on studies published between 2000 and 2016, and included data from the United States and countries with similar economic structures, such as the United Kingdom and New Zealand.

In initial review, five common themes emerged: 1) pricing/cost, 2) convenience and availability, 3) F&V quality, 4) store presentation/marketing, and 5) provider atmosphere. These themes were used as a guideline to identify potential areas of interest, but remained fluid throughout the literature review process. Focusing on these themes resulted in the collection and analysis of 17 peer-reviewed articles and 9 additional literature sources.

From this data, the team identified two gaps: 1) provider perception of low-income shoppers, and 2) selection process for FM locations. These gaps were used to focus the second phase of the literature review. The second phase did not result in the addition of any new resources, suggesting that more studies need to be done in order to collect data on these topics. The final total was 17 peer-reviewed articles and 9 additional literature sources.

Customer team

Researchers conducted a broad initial literature review on the produce purchasing decisions of SNAP participants using the University of Washington's library article search, PubMed, and Google Scholar. Key search terms included: "SNAP participants," "purchasing" (decisions, behaviors), "produce" (F&V), "urban," "farmers market," "supermarket," "nutrition assistance," "EBT purchases," "selection," and "low income." The search term "Food Stamps" was also included to ensure literature using the older terminology would be captured. This search focused on studies published between 2000 and 2016.

As the review was conducted, six common themes emerged: 1) price/cost, 2) convenience and availability, 3) household- and individual-level characteristics, 4) store influence on fresh fruits and vegetable purchases, 5) availability of F&V options, and 6) electronic benefits transfer (EBT)/assistance programs. These themes were used as a guideline to identify potential areas of interest, but remained fluid throughout the literature review process. Focusing on these themes resulted in the collection and analysis of 21 peer-reviewed articles and nine additional literature sources.

From this data, the team identified four gaps in the literature: 1) marketing/interventions, 2) culture/acceptance, 3) nutrition education's effect on low-income purchasing behaviors (with an emphasis on shelf life), and 4) food banks (relationship to F&V purchasing, reliance to offset other food costs). These gaps were used to focus the second phase of the literature review. The second phase of the literature review resulted in three additional studies and five additional literature sources and the theme of EBT assistance was incorporated within the five other themes. This brought the total to 24 peer-reviewed articles and 14 literature sources.

Assessment Tool Development

Researchers developed a tool, titled "Comparing Produce in Supermarkets and Farmers Markets Assessment Tool" (the Tool), to gather consistent, clear, and comprehensive data related to the primary objectives of this study (see page I of the Appendix). The Tool includes components related to price, quality, variety, merchandizing, and accessibility of the SMs and FMs of interest.

First, existing tools designed to assess FMs and SMs were reviewed. Numerous tools for assessing either FMs or SMs were identified, but none were designed specifically for assessing fresh, canned, and frozen produce in both SMs and FMs. The Farmers Market Audit Tool (F-MAT), developed by Shanks, Piits, and Gustafson (2015) to evaluate FMs in rural and urban communities provided a useful baseline for development of the Tool.[4] Using the F-MAT as a base, several questions were added to collect additional information pertinent to this study. For example, the F-MAT developers chose not to distinguish between organic and conventional

produce because they found that not all FM vendors included this information on product labels whereas the tool developed by the research team made this distinction. Additionally, the F-MAT was not designed to assess SMs, and therefore did not include questions related to canned or frozen F&V. Questions to assess canned and frozen produce were included in the Tool.

Other assessment tools used to audit SMs were also referenced, such as the Nutrition Environment Measures Survey (NEMS) used by the Yale Rudd Center (2007) to assess availability and pricing of various food items among small and large stores across neighborhoods.[5] It is important to note that in the Tool, all quality assessments were done based on appearance of produce and may not be indicative of nutritional or overall quality. The Healthy Retail Guide #1 (2010), developed by the Washington DoH, was used to determine which merchandizing and promotion strategies are commonly used in local SMs.[6] These strategies were recorded on the Tool based on their relevance to the study and feasibility for uniform data collection.

In order to standardize the F&V included in each assessment, nine produce items were selected based on availability at FMs and SMs in Seattle, WA during winter months. According to the Produce for Better Health Foundation (2010), the most frequently purchased produce items during January in Washington State are apples, pears, potatoes, onions, carrots, mushrooms, squash, kale, and collard greens.[7] To confirm availability of these items, members of the research team visited two FMs (Ballard & West Seattle) and two SMs (QFC in Wallingford & Safeway in Ballard) prior to the period of data collection. During these visits, the researchers confirmed produce availability by specific varieties most common to Seattle vendors. At least one variety of the nine previously mentioned F&V were available in each location, and as many as 23 varieties of a single fruit were observed. The scope of data collection was further narrowed to the most commonly purchased varieties of each F&V (*i.e.* Granny Smith vs. Jonagold apples). Identifying specific produce varieties allowed price comparisons by specified variety to be made at each assessment site. Additionally, the Tool included a section to record the least and most expensive options for each F&V item, regardless of variety, or origin.

Literature review findings were also taken into account in the development of the Tool. Major literature review themes, such as cost, quality, and variety were incorporated into the Tool. To account for dynamic price changes, both regular and sale price for each item were recorded. Factors related to the shopping environment of the store, such as customer service, family activities, and taste testing were also included in the Tool. In terms of convenience, factors related to location, hours and days of operation, parking, and nearby bus stops were included, as these were identified as barriers to SNAP participants shopping at FMs.

To improve consistency between assessments, detailed instructions for utilizing the Tool were developed. The instructions included a picture guide for assessing produce appearance according to a standard scale. Because the researchers were unable to assess quality in this

study, appearance was assessed as a perception of quality. Based on the literature review, SNAP participants perceive dirty F&V as being lesser quality.[8] The team created the following criteria for assessing the appearance of fresh produce at both FMs and SMs:

(A) **Perfect**: peak condition, top quality, good color, fresh, firm, clean

(B) **Good:** good/acceptable condition, relatively fresh-looking, minor defects (e.g. several bruises, several dark spots on the fruit skin, dirty), overall acceptable but not perfect

(C) **Poor:** bruised, old looking, mushy, dry, overripe, dark sunken spots in irregular patches, cracked or broken surfaces, signs of shriveling, mold or excessive softening, generally displeasing to the eye

Site Selection

Data was collected from the city of Seattle year-round FMs (n=4) that exclusively sell local produce. These are located in different neighborhoods: Ballard, Capitol Hill/Broadway, U-District, and West Seattle. There was no year-round FM in South Seattle. SMs (n=9) within two miles from these four FMs were identified by the Washington DoH as target locations to acquire pricing information for selected fresh, canned, and frozen F&V. These stores were also assessed in an earlier market basket cost study in Seattle.[9] The initial SMs identified included: Safeway and PCC Natural Market (West Seattle); Safeway, Whole Foods, and QFC (U-District); QFC and Safeway (Capitol Hill); and Safeway and Fred Meyer (Ballard).

Pricing concerns by SNAP participants as identified in the literature motivated researchers to substitute two mid-to-low priced SMs (Red Apple Market and Grocery Outlet) for the two higher-priced stores (Whole Foods and PCC). Both were within two miles of the Capitol Hill FM. Red Apple is a locally owned and operated SM chain, and Grocery Outlet is an independently run "bargain market" that buys excess inventory from producers when they experience overruns or packaging changes.[10]

The QFC in Capitol Hill was not assessed. Although permission had been given by QFC corporate prior to the store visit, the in-store manager was not aware of the assessment and was unable to give permission without corporate's direct written or verbal consent. Researchers attempted to assess the store on a Sunday, when corporate headquarters was closed. Thus, the total number of assessed SMs was eight.

Map 1: Location of assessed FMs and SMs, and SNAP Household Density in Those Areas

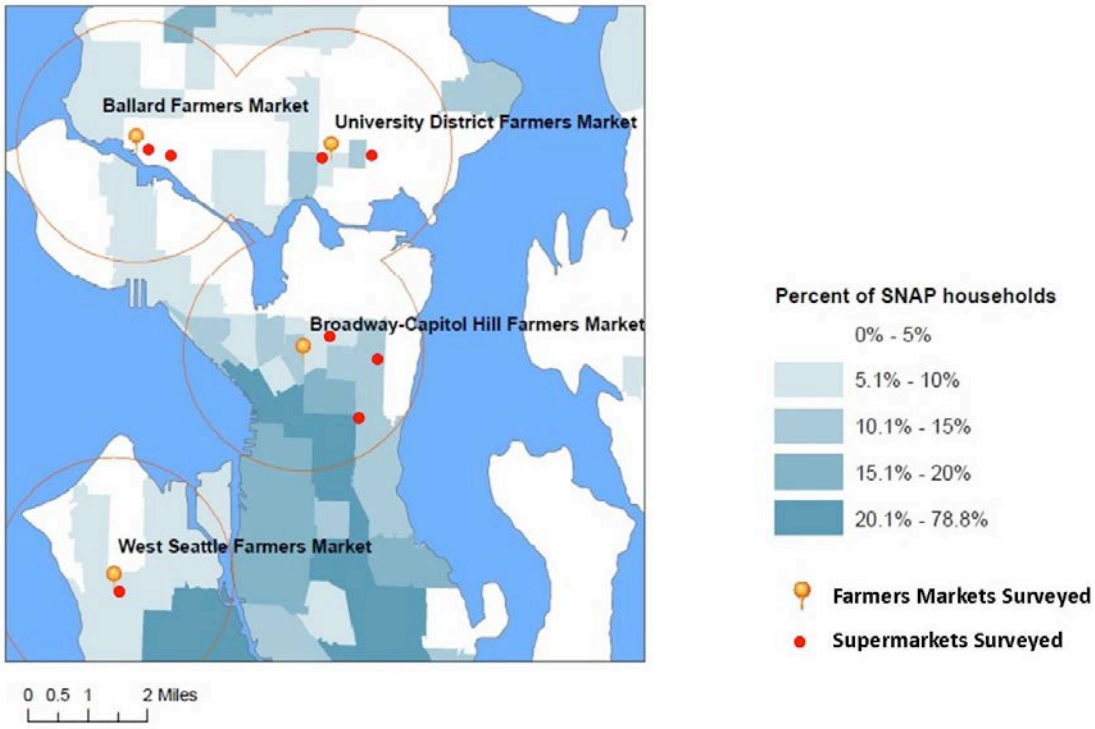


Table 1: Neighborhood Demographic Chart

	Population Size	White (n%)	Non-White (n%)	Household Demographics (n%)	Median Income	Below Poverty Level	Families Below Poverty Level
U District	18,722	11,470 (61.3%)	7,252 (38.7%)	Non-Family (76.7%)	$23,579	46.8%	11.8%
W Seattle	18,385	15,336 (83.4%)	3,049 (16.6%)	Families (51.3%)	$73,101	7.2%	3.2%
Capitol Hill	20,952	14,838 (70.8%)	6,114 (29.2%)	Non-Family (81.9%)	$48,182	16.2%	9.8%
Ballard	7,425	5,893 (79.4%)	1,532 (20.6%)	Non-Family (68.1%)	$60,625	8.0%	2.1%
Central Area	17,911	11,091 (61.9%)	6,820 (38.1%)	Non-Family (62.0%)	$67,142	13.7%	6.7%
Judkins Park	3,048	1,005 (33.0%)	2,043 (67.0%)	Non-Family (71.1%)	$45,239	23.0%	11.7%

Data Collection

Prior to data collection, the Washington DoH contacted the selected FM and SM managers in order to obtain permission to collect in-store data. All researchers were trained on use of the Tool before beginning data collection to ensure homogeneity between researchers. Once the researchers arrived at the venue, permission to assess the store was again confirmed by either a manager or customer service agent.

Both teams of researchers used the Tool to record the total number of varieties, the cost of selected varieties, and least and most expensive produce item in each fresh produce category. Produce was divided by conventional (non-organic) and organic. Price was recorded as price per pound when possible and produce sold by bunches was converted to price per pound. Appearance was measured using a rating scale of "Perfect", "Good", or "Poor". Researchers also recorded produce source and merchandising.

Environmental factors of each provider were recorded. Researchers noted information provider customer appeal (e.g., Customer Service Station, general promotions, kid-friendly activities, entertainment on-site, etc.) and hours of availability. Accessibility data that was recorded included: parking availability, proximity to bus stops within 0.2 miles and walkability scores (King County Metro: TripPlanner; Google Maps; SM websites). Local SNAP participation by census tract was also denoted.

Farmers Markets

Data collection for FMs took place on subsequent weekends (January 24-25, January 30-31) and researchers began the assessments at the earliest opening time for each market (between 10 and 11 am). Assessments lasted approximately two hours. Prior to data collection, researchers introduced themselves to vendors and explained the study purpose. Generally, vendors were open to discussion of their products and growing practices. Many vendors noted their products were grown using organic practices regardless of organic certification status. However, researchers only recorded produce items in the "organic" section of the Tool if they were certified organic through the United States Department of Agriculture. All other produce was recorded in the conventional section.

To facilitate the data collection process, each researcher was assigned to collect data on up to three produce items. Price, quality, and variety were collected for each produce item specified in the Tool. Per pound prices were collected for each produce item with the exception of mushrooms, kale, and collard greens. Mushrooms were priced by volume; both kale and collard greens were priced per bunch. Any discounted prices were noted in the "sale" section of the Tool.

Supermarkets

Store and pricing information were gathered using the Tool, focusing on three sections of SMs (canned, frozen, and fresh produce). The first two SM assessments were completed by all researchers to ensure homogeneity in recording practices. Subsequent grocery visits were done by groups of two or more, and each researcher collected data for different sections to prevent overlap. Each researcher recorded data for different sections during each assessment. The date, location, and time of visit were noted, and all store data collection was completed within a three-week period between January and February of 2016. The majority of SM visits occurred on weekend days (Friday: 4 visits, Saturday: 2 visits, Sunday: 1 visit) and one visit occurred on a Tuesday. Weekend assessments occurred during the early afternoon (start time between 1:15 & 3:30 pm) and the weekday visit occurred at noon. All assessments lasted approximately one hour.

Fresh produce was recorded as above and by price per pound except for bunches of collards, kale and some carrots which were weighed to find the average price per pound. The price and product information of canned and frozen food were only recorded if they contained no added salt, sugar or fat due to restrictions of the FINI grant incentives. If these items were present but contained added salt, sugar or fat, they were recorded as sold at the location, but all other values were not recorded. Canned items also included glass or plastic containers as long as there was no added salt, sugar or fat (i.e. applesauce).

If the store carried an item that was sold out, it was recorded accordingly. The regular price and sale price (if applicable) were recorded for each item. Merchandising strategies of items were also recorded, such as sale signs, displays, tags, location on shelf (e.g., eye level). Location of origin was recorded for fresh items (when available) as within Washington State, out of state, outside U.S., or unknown. Items that were labeled as in the U.S. without state specification were recorded as out of state. Any nutrition-related informational posters, recipe suggestions on display cards or packaging, and signs relating to healthy eating were also recorded.

Data Input

Data collected during the FM and SM assessments was compiled into nearly identical Microsoft Excel spreadsheets designed to accompany the Tool. The FM analysis spreadsheet contained an additional column capturing the cheapest produce variety and the SM analysis spreadsheet captured multiple geographic origins of certain produce items.

Analysis was carried out based on regular prices, and did not include analysis of sale prices, club prices, or other promotions. To compare produce prices, the least expensive options for each produce item were averaged among SMs and FMs as well as for canned and frozen.

The percentage of labeled produce was calculated by dividing the number of items labeled by the total number of produce items recorded. This same method was used to calculate the percentage of canned and frozen items displayed at eye level, and percentage of FM produce marketed with taste testing. Researchers also stratified data by use of promotional signs and identified phrases used frequently on these signs.

The FM analysis spreadsheet included for mushrooms, price by volume was converted to price by pound using the online aqua-calc calculator.[11] Produce priced per bunch was converted to price by pound using SM bunch weight averages.

To analyze location of origin for fresh items at SMs, a total count of all mentions of each location category was recorded for each produce item (within WA, out of state, outside the United States, unknown). In cases where two locations were identified for a single variety, both locations were counted. Location percentages were calculated from the total count of each location for conventional and organic produce separately.

Kale, collard greens, and some carrots were priced by bunch. Some bunches of collards were not weighed in store. For these, an average based on the average weights of bunches collected at SMs was used (1 pound). Prices for canned and frozen items were standardized to 16 ounces to make them comparable.

Key Informant Interviews

Standardized qualitative phone interviews were conducted with retail produce managers from local SMs (n=4) to assess perceptions of F&V cost, availability, and purchasing patterns among low income customers. The interview consisted of 13 open ended questions (see page 35 of the Appendix). These questions were developed for our study-specific research purposes prior to recruiting participants. Each researcher conducting interviews received training on interview format, protocol, and subject rights prior to conducting interviews. All interviews and questions were approved by the Internal Review Board.

Produce managers were recruited based on SM proximity to FMs included in this study. All eligible participants were within two miles from an assessed FM. The researchers obtained approval from SM upper management prior to contacting the produce managers. Produce managers were recruited by phone and provided basic information about the purpose of the research prior to deciding whether or not they wanted to participate. Overall, four interviews were conducted; six of the original ten potential interviewees declined to participate.

Phone interviews were conducted by teams of two researchers. One conducted the interview by reading an informed consent script and the predetermined questions, while the other electronically scribed all produce manager responses. All participants had previously agreed to participate in the interview, and a time was scheduled for their interview. Researchers began the interview by providing a brief background of the study, describing the

interview format, and obtaining final consent to participate. When verbal consent to participate was confirmed, the interview questions were presented in sequential order. Additional prompts, expanding on the script, were presented when clarification was requested by interview subjects. All interview audio was recorded, and all recordings were destroyed at the end of this study.

Three interviews were conducted by phone except for one produce manager who was interviewed in-person at the retail location based on the interviewee's preference. Researchers received Internal Review Board approval to conduct an on-site interview, and the same format and protocols were used. After completion of the interviews, all records were de-identified and analyzed to identify common themes, patterns and trends. These are presented in the results section.

RESULTS

Literature Review

This review is a cohesive analysis of content found by both literature review teams (the provider team & the customer team). All results are presented by major themes: price/cost, convenience/availability, quality/value, store atmosphere, and household/taste preference. A visual representation of these findings can be found in Tables 1 and 2 of the Appendix.

Major Themes

Price/cost

Though SNAP participants recognize that F&V support good health,[12] participants are not consuming enough fresh produce.[13,14] The perception that F&V, as with other healthy foods, are too expensive is identified as the most common and significant factor limiting F&V purchase and consumption.[13,15–21] Consequently, customers are more likely to buy less expensive F&V, regardless of quality, whether they are less expensive because of sales, everyday low price, or redemption vouchers.[19] Nutrient-dense foods are significantly more expensive per calorie than energy-dense foods, and are more subject to inflation to a large degree confirming that price barriers to F&V consumption are in fact present.[9,22]

Financial incentives have been shown to support F&V purchase. Given the significant factor of cost, well-advertised F&V incentive programs are essential to increasing purchase at both SMs and FMs, and have been shown to support their increased purchase.[13,16,21,23–25] Cash Value Vouchers have also been shown to be an effective means of increasing F&V purchases, but these are not dispersed as a part of SNAP benefits.[26]

SNAP participants spend a larger percentage of their total expenditures on food and are more affected by price differences in foods than SNAP-ineligible persons.[23] A national study by *Share Our Strength* (2012) reported that 1 in 4 low-income families skip healthy purchases because they feel they cannot afford them.[27] Additionally, families affected by the recession are more likely to skip healthy purchases.[27] This perception may be complicated by the concern that produce has a short shelf-life and by the desire to seek out meat as a compliment to less expensive starches.[28,29] In addition to this, low F&V consumption may be limited by overarching pessimism among SNAP participants about the value of making dietary improvements on their health.[1]

With cost as a strong limiting factor, the research suggests that SNAP participants tend to buy their groceries early in the month, around the time of assistance dispersal.[1,18,30] According to the USDA, 80% of all benefits are used within the first two weeks after

disbursement, and more than 91% of benefits are used within the first 21 days.[31] Research suggests that when participants' funds are limited at the end of the month, many SNAP participants stretch their remaining funds on less expensive, carbohydrate-rich foods such as ramen, potatoes, and pasta to avoid hunger.[18,30] In 2013, SNAP benefits were reduced, requiring SNAP participants to stretch their limited benefits even further.[32] Many SNAP participants also depend on alternative forms of food assistance like food banks, which report spikes in visitors later in the month as SNAP benefits become exhausted.[28,33]

Research suggests SNAP participants often compare stores when shopping, bypassing closer stores in search for good deals and discounts, and weighing their purchase decisions carefully.[18,19,28,34] While shopping, SNAP participants also buy what they need, buy in bulk when affordable, and pass up foods known to be available through other assistance programs.[18,19,28,29,34]

Pricing is affected by the presence of more FMs and SMs in the area; the presence of competition causes the total cost of market baskets to drop, which seems to be especially true during FM operating seasons.[35] This suggests that perhaps it is within SNAP participants' interests to shop in areas that have a variety of shopping options, including FMs and SMs. Local, Seattle-area research suggests wide variation in SM price for similar items between retailers.[9]

Despite many SNAP participants' perceptions, research has been inconclusive in determining whether FMs or SMs are lower in cost. Some studies find that FMs are more expensive than SMs, and other studies find that SMs are more expensive than FMs.[36–39] Pricing is highly dependent upon location of both FMs and SMs, but does not seem to be dependent upon socioeconomic status (SES) of local residents.[40] Typically, stores in lower income areas use everyday low pricing, and stores in higher income areas use dynamic pricing that highlights sales and price changes each week.[41] Dynamic pricing is more profitable, but not by much, leaving stores the ability to tailor their pricing strategies to the area without consequence of profit loss.[42]

Convenience/availability

Though perception of high prices is a significant factor limiting F&V purchase, issues of convenience are also important. The monthly distribution system and longer distance to SMs may contribute to findings that SNAP participants are more likely to shop once a month than non-participants.[1] When they do shop, SNAP participants value convenience in location and hours of large SMs as well as the desire to multi-task and complete all their shopping at one time.[2,14,19] SNAP participants often turn to superstores, supercenters, or large retailers for their groceries.[3,40] As much as 80% of SNAP redemptions are made at these stores despite being only 22% of the total vendor market.[14,43] These stores may set the bar for affordability and pricing, leaving FMs to compete with SM pricing.

The desire for convenience may limit SNAP participants' purchase of F&V at FMs.[14,20] Some people find it difficult to shop at FMs because they have limited days and hours of operation, and tend to be a long distance from home.[36] A general lack of awareness of FMs is also an issue and could be related to the lack of FMs in SNAP participant-dense neighborhoods.[14,20,28] Even so, SNAP participants do not tend to report access and transportation to markets as top barriers, with the exception of the elderly and those without a car.[2,14,15,17] Regardless, it is recommended that when opening FMs and SMs, food insecure areas should be of higher priority since distance to FMs and SMs can impact F&V intake.[44,45]

Some low-income residents may prefer to get their F&V at small food stores or convenience stores that are closer to home.[46] Research has shown that as few as 50% of these kinds of stores stock fresh F&V, while 80% or more stock processed F&V, suggesting that these are not good options for F&V purchasing.[47] Participants may also seek out ethnic SMs for cultural items.[18,47] Research has shown that SMs devote more shelf space to F&V and provide more fresh F&V than smaller stores,[48] typically the larger the store, the more F&V they stock and the more variety they carry.[47] Even so, low-income shoppers also tend to buy more F&V at smaller stores in their neighborhoods if there are more fast food chains and other limited-service establishments around, which is common in lower SES areas.[46]

The presence of FMs in a community can increase F&V availability and increase consumption by participants.[49] Lack of EBT acceptance at FMs may prevent SNAP participants' attendance.[8,19,20] In addition, SNAP participants are often not aware of FMs that do accept EBT.[14,20] FM centralized EBT system can be complex, often using stigma-inducing tokens that require exact transactions and multiple passes through the FM as participants estimate the value of tokens needed.[14] Some barriers to FMs accepting alternative forms of payment such as EBT are low redemption rates and unreliable subsidies, which can be self-perpetuating problems.[50].

When shopping, some SNAP participants weigh convenience of processed foods over fresh F&V products. Shoppers are known to choose things that are convenient for them in terms of mental work, physical work, price, and location within the store.[51] Participants may rely on pre-packaged food at SMs due to lack of cooking knowledge, time restraints, and their perceived affordability, which are especially important among working women.[14,15,27] To combat these barriers, SMs and FMs are sometimes instructed to provide pictures and recipes near F&V displays to increase their purchase.[52] Providing convenient options such as pre-packaged bags to make specific foods (*i.e.* tomatoes and jalapenos to make salsa) or snack-sized bags are encouraged in SMs to improve sales.[19,51] However, simply providing F&V displays near registers does not seem to increase sales.[51]

Quality/value

Convenience and cost of F&V are weighed against quality and perceived value, with SNAP participants seeking to maximize low prices and high quality produce.[2] SNAP participants value the cleanliness and freshness of F&V and look for signs of dirt and spoilage including mildew, mold, and odor.[8,19] Many recipients of federal food assistance programs know that the way F&V look are not always indicative of quality, and would be willing to buy imperfect or irregular produce as long as it is not spoiled.[19] In the future, this may be an opportunity for markets to sell produce usually wasted and for shoppers to buy more inexpensive produce. To improve sales, SMs are told to keep unblemished and uniform F&V in the view of customers, and have produce well stocked, without it seeming like an inordinate surplus which can actually reduce purchasing.[52]

Perception of food quality at FMs by SNAP participants is mixed, with some studies suggesting SNAP participants believe FM produce is of better quality because it is fresh.[8,28] and others indicating that FM produce is of lower quality because it is not as regulated as superstore produce.[14] Diversity of produce matters to some participants, as some participants do not want to be limited by seasonality of local produce at FMs.[28] FMs may have a wider variety of produce with higher quality when compared to SMs,[35] but these variables differ by community and season.[47]

SNAP participants tend to prefer fresh F&V to canned or frozen[2] and cite lack of quality and variety as factors decreasing their willingness to shop at some SMs.[15] Although lack of quality and variety are cited as barriers for SNAP participants, research shows that there is no statistically significant decrease in F&V quality and variety in different SES areas; regardless of statistical significance, low SES areas may have marginally lower quality produce and slightly less variety.[40]

Because SNAP participants often purchase food for the month ahead, they are more likely to consider the shelf life of an item, even compared to income-eligible nonparticipants.[1,13] This suggests that purchasing habits may be altered if dispersion dates were more frequent. One study found that SNAP participants may be more likely to purchase fruit, as it is often well-liked and more quickly consumed, than vegetables, which can be perceived as spoiling faster and requiring additional preparation.[28] Canned goods may be seen as lower quality and may not be purchased because some food assistance programs provide them at no cost.[29] Studies have shown that there is no nutritional quality difference between SM brand foods and larger brands, suggesting that spending less money to get the SM brand versus a name brand does not sacrifice quality.[53] This may or may not be applicable to canned/frozen F&V.[53]

Store atmosphere

Pleasant, clean store-atmospheres may promote F&V purchase. Low-income shoppers may value an internal store atmosphere that is clean, well-lit, well stocked and spacious aisles that are most often found at larger, newer SMs.[19] Similarly, SNAP participants value the family-friendly outing and social interactions at FMs.[2] Opportunities to sample produce in FMs encouraged shopping and expanded participants' cultural horizons by inspiring them to learn about other cuisines and cultures.[2]

Customer service was an important influence on purchasing behaviors in both larger SMs and in FMs. Pleasant, helpful, and knowledgeable staff were sought after, and found to influence store choice.[19] Despite appreciating a good relationship with the store, most participants in one study expressed that grocery shopping was simply a mundane part of life and wanted the least distraction possible.[19] SNAP participants sometimes find FM staff helpful and more family-friendly than large chain SM staff members, but also may feel stigmatized when using their benefits at FMs.[2]

Though shopping at FMs is positively associated with improved F&V intake[8,14], SNAP participants often perceive FMs as too expensive and do not see themselves as part of the FM demographic.[14,17] This demographic can be perceived as white, female, well-educated, of middle to high income, older, and vegetarian.[14] SNAP participants can feel excluded from FMs and FM managers, farmers, workers, volunteers, and shoppers need to work together to remove that social barrier and ensure people living in a lower SES feel comfortable.[54]

Household factors and taste preferences

Personal taste also affects food purchasing decisions.[1] Some people will forego F&V in favor of more energy-dense foods of equal price.[46] Parents receiving SNAP benefits must balance their desire to provide healthy foods that are potentially more expensive with low cost foods they know their children will eat, such as sugar sweetened beverages and snacks with low nutritional value.[18] Desire to improve child health may be a strong motivator for F&V purchases,[19,29] and studies document a high interest in eating more healthy meals and fresh produce, especially among women.[17,27] Though parents value providing well-balanced meals, they often do not consider the nutritional value of low nutrient-dense snacks between meals.[18] Lack of knowledge around cooking and nutrition may be a barrier to consuming healthy meals and F&V.[15,17,18]

Diversity in household size and age correlates with increased produce consumption. Larger households have been shown to eat significantly more healthy meals, spending more money per capita on food, more time preparing meals from scratch, and using more raw ingredients.[27,55] Households with wider range of child ages buy larger varieties of fresh F&V.[56]

Research also shows that women typically consume more F&V than men, resulting in a higher overall food cost for females than males.[51]

In terms of culture, it was found that residential segregation, alongside other cultural barriers, affected FM use.[14] Some SNAP participants seek out retailers that better fit their ethnic and cultural backgrounds, and provide produce not available at mainstream SMs.[43] Some SNAP participants are also cognizant of sustainability and local production and try to buy locally at FMs.[19] Generally, food insecurity was negatively associated with measures of acculturation, including perceived difficulty in understanding the language and culture in the United States; acculturation is presented as a potential constraint for F&V access.[31]

Provider Assessments

This study found differences in cost, appearance quality, and availability between FM and SM organic and conventional produce. Key findings are listed below:

Major Findings

Cost

- Conventional fresh produce is less expensive at SMs compared to FMs.
- Organic fresh produce prices at SMs and FMs are competitive. However, on average, organic fresh produce prices are higher at FMs than SMs.
- Fresh produce is typically less expensive than canned and frozen produce.

Quality

- Quality of produce, determined by appearance, is better in SMs than in FMs.
- Canned goods often have added sugar, salt or fat.

Availability

- SMs offer a greater variety of fresh conventional produce than FMs.
- Variety of fresh organic produce is comparable between FMs and SMs.
- Local produce is more widely available at FMs than SMs.

Environmental Factors

SMs had more hours of availability compared to FMs. On average, SMs were open 19 hours per day while FMs were only available an average of 4.5 hours per week, typically all in one day. SMs had plentiful parking and handicap parking, suggesting that perhaps they are

more accessible by car than FMs. The availability of Bus Stops was similar for both FMs and SMs.

Provider	Neighborhood	Hours of Availability	Parking (Regular & Handicap)	Number of Bus Stops	Outlet type
Farmers Markets					
Ballard	Ballard	10 AM - 3 PM	None	8	Year Round FM
Broadway	Capitol Hill	11 AM - 3 PM	None	10+	Year Round FM
West Seattle	West Seattle	10 AM - 2 PM	Available	10+	Year Round FM
University District	University District	9 AM - 2 PM	Available	10+	Year Round FM
Supermarket					
Fred Meyer	Ballard	7 AM - 11 PM	Available	5	Low-cost SM
Safeway	Ballard	24 hours/day	Available	6	Medium-cost SM[9]
Safeway	Capitol Hill	5 AM - 1 AM	Available	10+	Medium-cost SM[9]
Safeway	West Seattle	24 hours/day	Available	10+	Medium-cost SM[9]
Red Apple	Judkins Park/Madrona-Leschi Border	7 AM - 11 PM	Available	10+	Low-cost Discount Grocer
Grocery Outlet	Central Area	8 AM - 10 PM	Available	10+	Low-cost, Discount Grocer
Safeway	University District	6 AM - 9 PM	Available	8	Medium-cost SM[9]
QFC	University District	24 hours/ day	Available	5+	Medium-cost SM[9]

Cost

Overall, pricing of both conventional and organic fresh winter produce was higher at farmers markets compared to supermarkets. On average, conventional fresh produce prices were higher at FMs than SMs. Organic fresh produce prices at SMs and FMs were competitive. However, on average, organic fresh produce prices were higher at FMs than SMs. Pricing of produce items was similar between all FMs, whereas there were discrepancies in pricing of produce items between SMs. The data highlights that FM produce may be more expensive than SM produce in comparable locations.

Cost of organic and conventional fresh winter produce at Farmers Markets versus Supermarkets

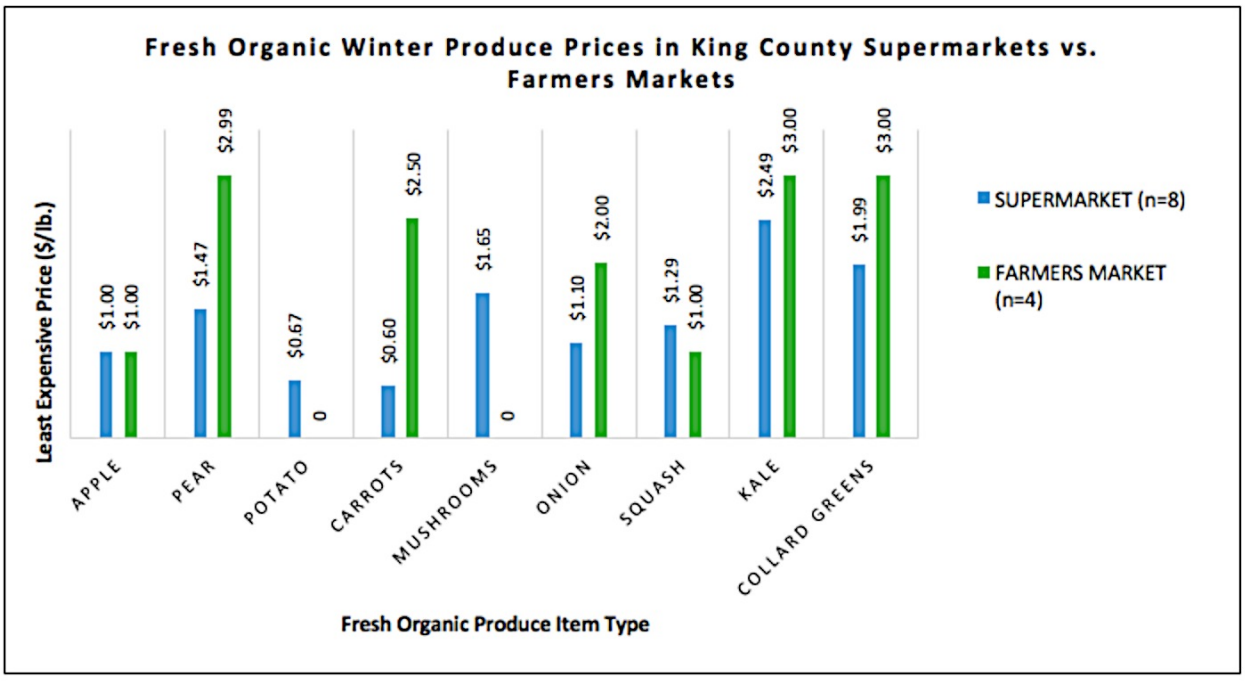


Figure 1

Figure 1 depicts the least expensive organic winter produce from the eight SMs and four FMs. As shown, FM organic, fresh produce items are more expensive on average, with the exception of organic winter squash. Additionally, least expensive organic apple prices were the same at SM and FM. FMs included in this study did not carry organic potatoes or organic mushrooms.

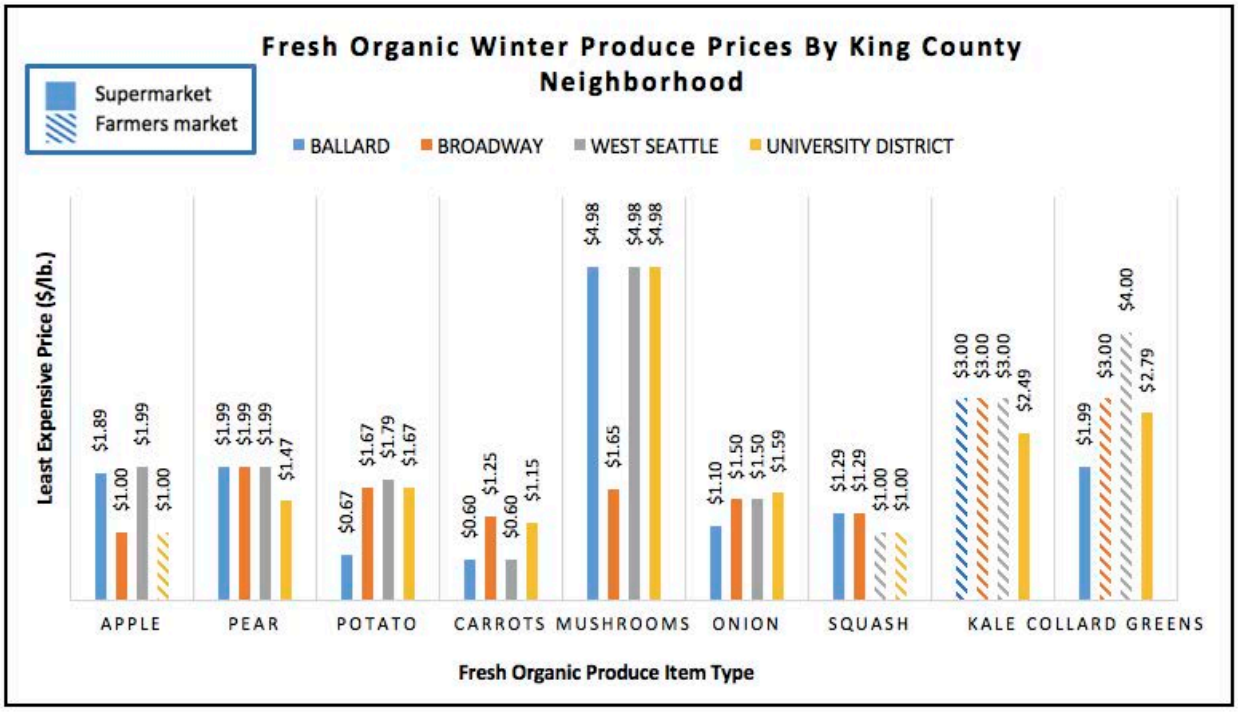


Figure 2

Figure 2 depicts the least expensive organic winter produce grouped by neighborhood. Solid bars represent that the least expensive price was from a SM, while striped bars represent that the least expensive price was from a FM. On average, organic winter produce is less expensive at SMs when compared to FMs. However, it is important to note that organic winter squash, kale, and collard greens tend to be less expensive at FMs than SMs.

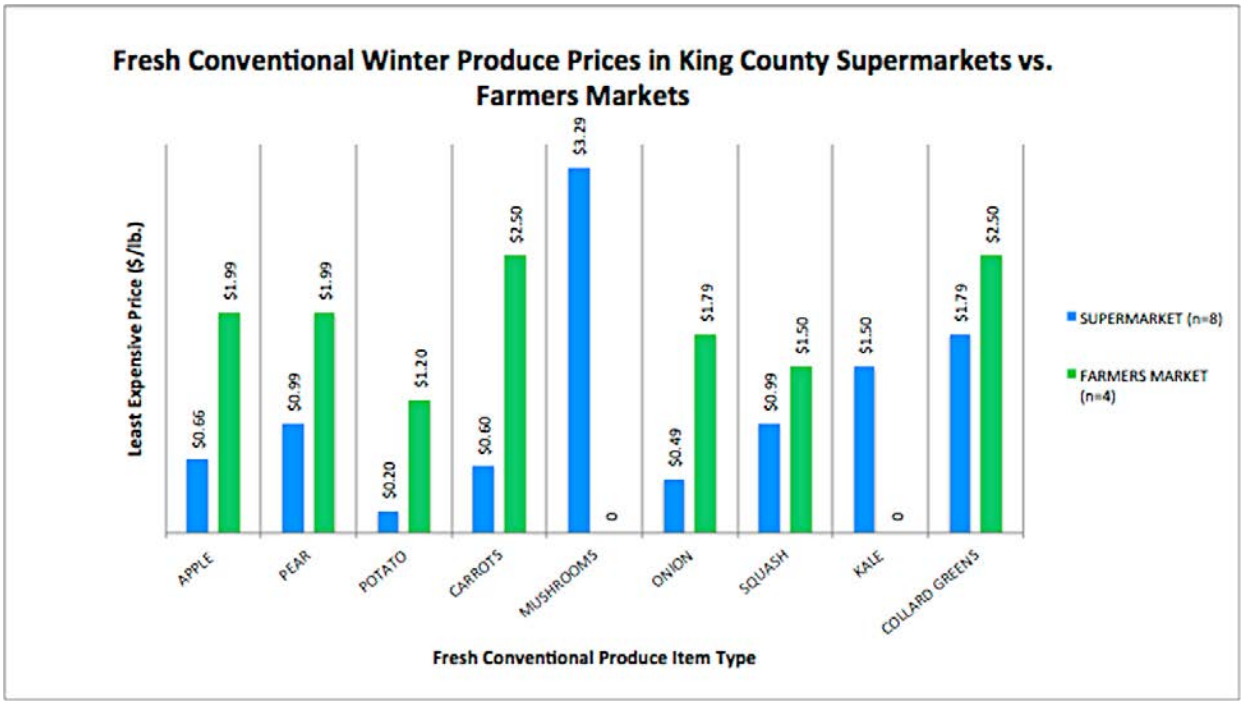


Figure 3

Figure 3 depicts of the least expensive conventional fresh winter produce items in SMs and FMs. Within each category of fresh conventional winter produce items, the FM price was higher than the SM price. FMs in this study did not sell conventional kale. FM conventional mushrooms ($50/lb) were excluded from this graph to prevent skewing; these mushrooms may have been an outlier due to high price per bulk weight of conventional mushrooms and inaccuracy with the online conversion tool. Overall, FM conventional produce items had a higher cost than conventional SM produce items.

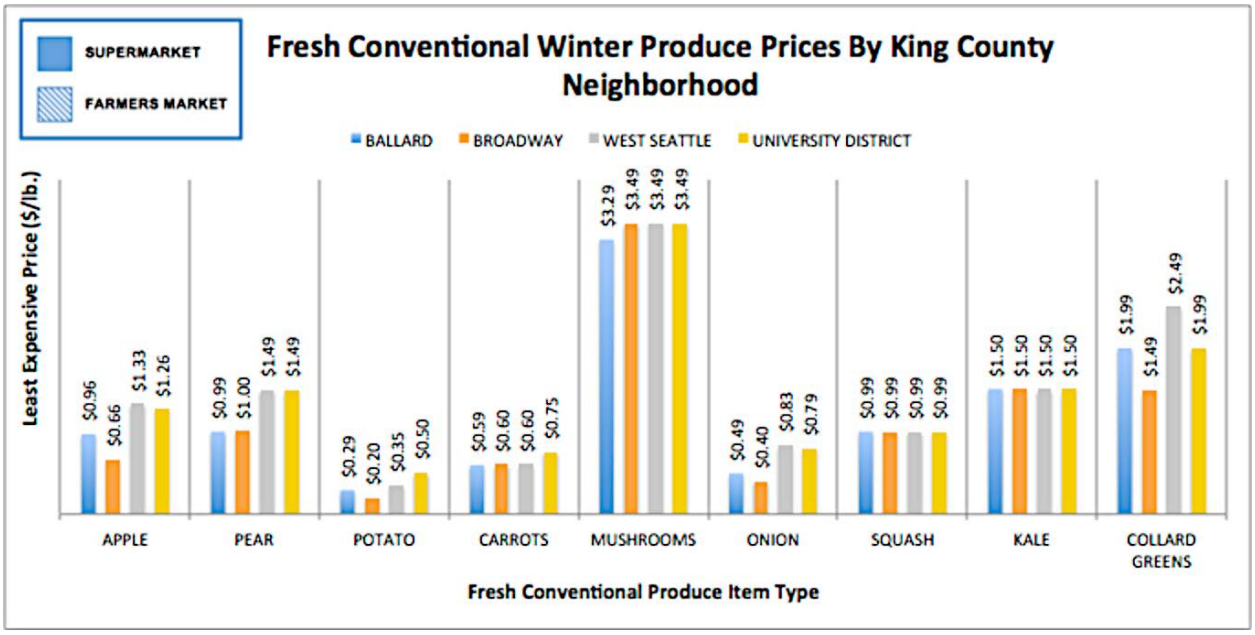


Figure 4

Figure 4 depicts the least expensive fresh conventional winter produce items, grouped according to neighborhood. Solid colored bars indicate the least expensive price for that produce item was from a SM. Striped bars indicate the least expensive price for that produce item was from a FM. The absence of striped bars on this graph highlights that the least expensive conventional fresh winter produce items were all from SMs within each neighborhood. None of the FMs had the least expensive price for any items on this graph. This suggests that SMs may be less expensive than FMs when it comes to fresh, conventional winter produce.

Additionally, this graph displays the variability of SM conventional produce pricing items between neighborhoods. The least expensive prices for kale, carrots, mushrooms, and squash are relatively consistent between the four neighborhoods. However, prices for collard greens, apples, onions, pears, and potatoes were largely variable by neighborhood. Within these variable groups of produce items, least expensive prices appear to be highest in West Seattle (n=1) and lowest in Capitol Hill (n=3). Overall, data displayed in this figure suggests there were discrepancies in pricing of fresh conventional winter produce items between SMs.

Cost comparison of fresh, frozen and canned winter produce at Supermarkets

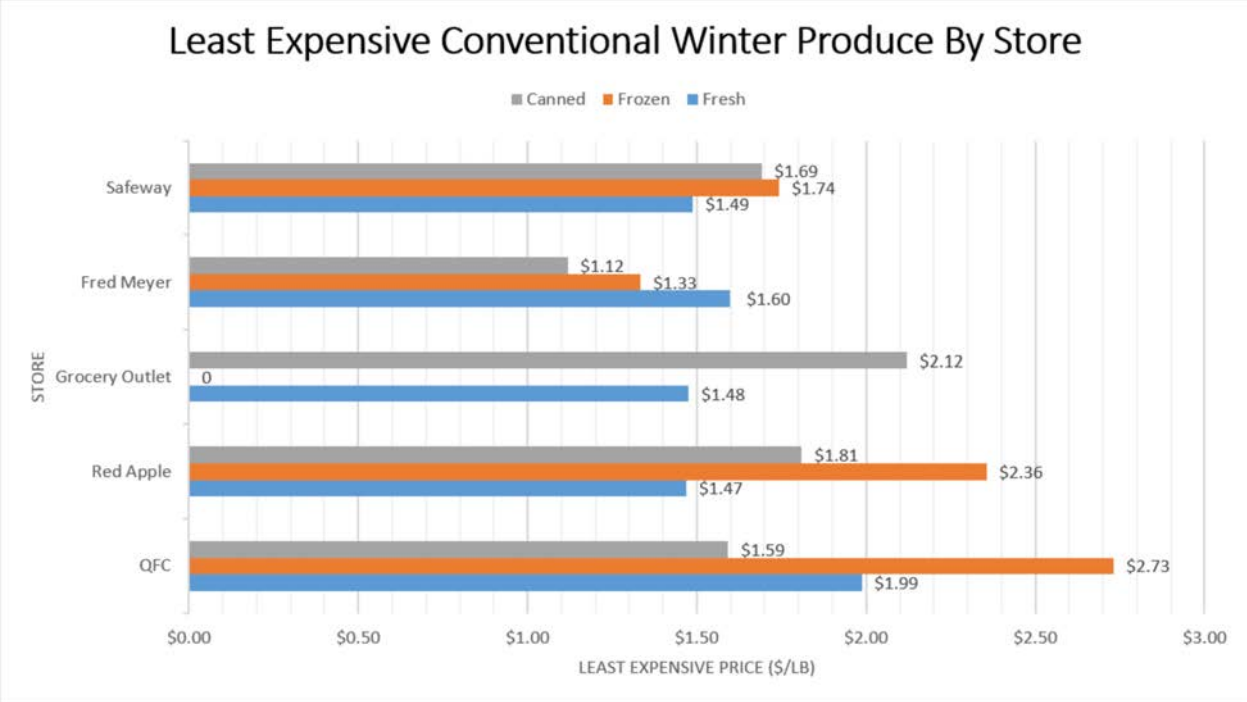


Figure 5

Figure 5 depicts comparisons of the average price for the least expensive conventional fresh, frozen and canned items in SMs. Safeway represents the average of least expensive produce items from all four Safeway stores that were assessed. The (0) listed next to Grocery Outlet denotes that there were no conventional frozen items in store during the assessment that met the SNAP requirements or were specifically identified by the Tool. (Note: Grocery Outlet's stock rotates frequently.)

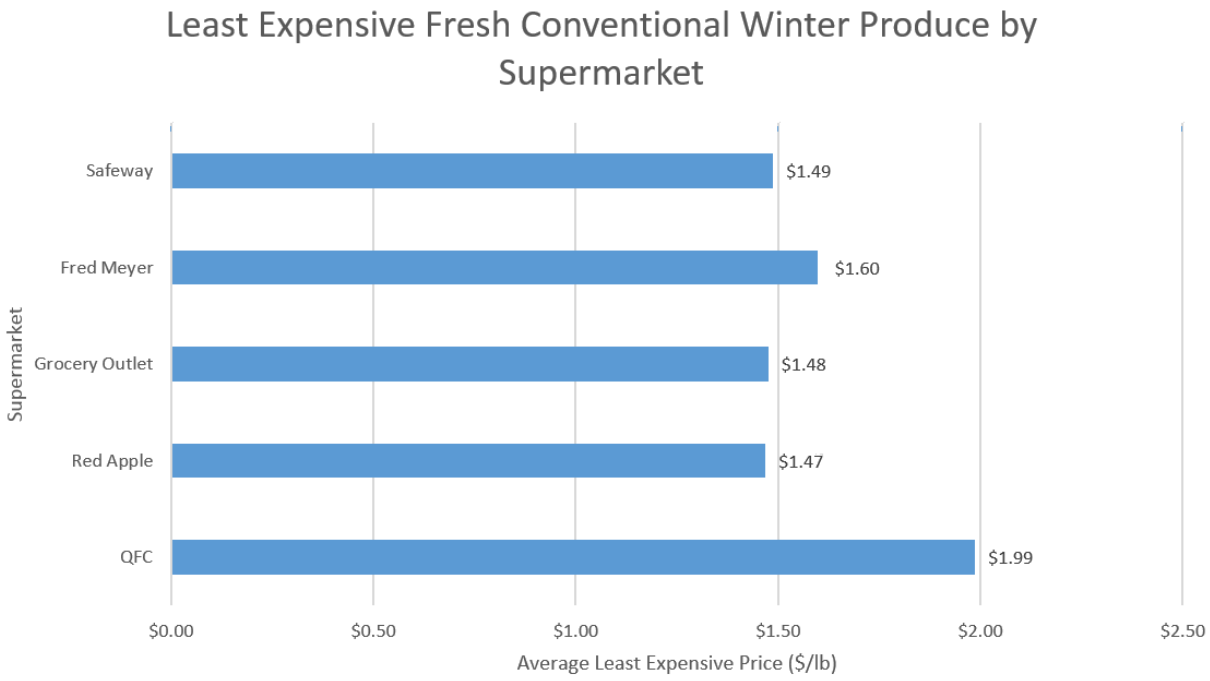


Figure 6

Figure 6 depicts the average cost for the least expensive conventional fresh items in SMs. Safeway represents the average of least expensive produce items from all four Safeway stores that were assessed on the Tool.

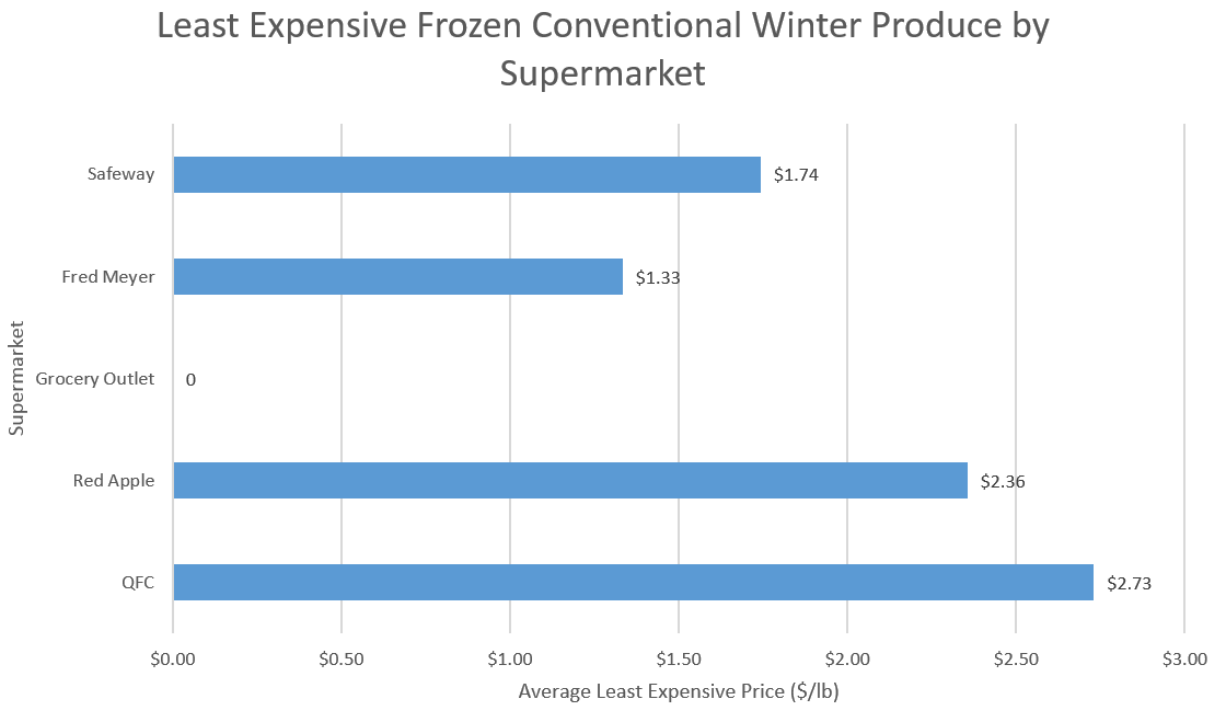


Figure 7

Figure 7 depicts the average cost for the least expensive conventional frozen produce item in SMs. Safeway represents the average of least expensive produce items from all four Safeway stores that were assessed on the Tool. The (0) listed next to Grocery Outlet denotes that there were no conventional frozen items in store during the assessment. (Note: Grocery Outlet's stock rotates frequently.)

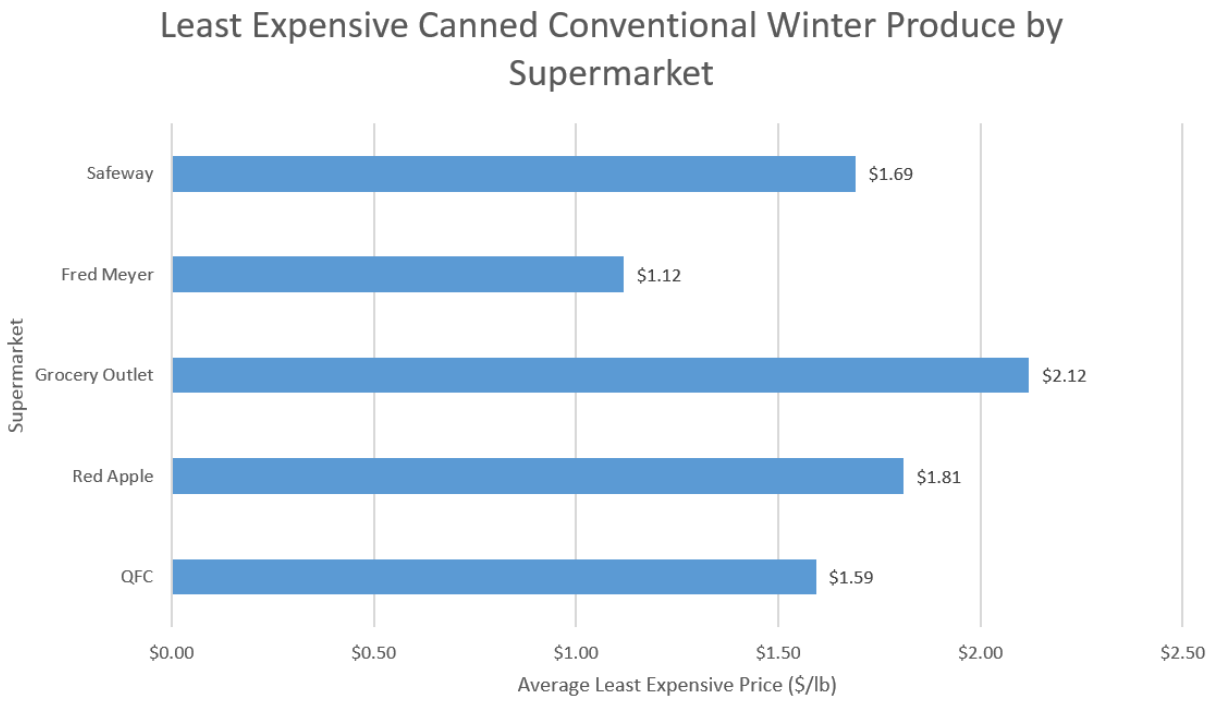


Figure 8

Figure 8 depicts the average cost for the least expensive conventional canned produce item in SMs. Safeway represents the average of least expensive produce items from all four Safeway stores that were assessed on the Tool.

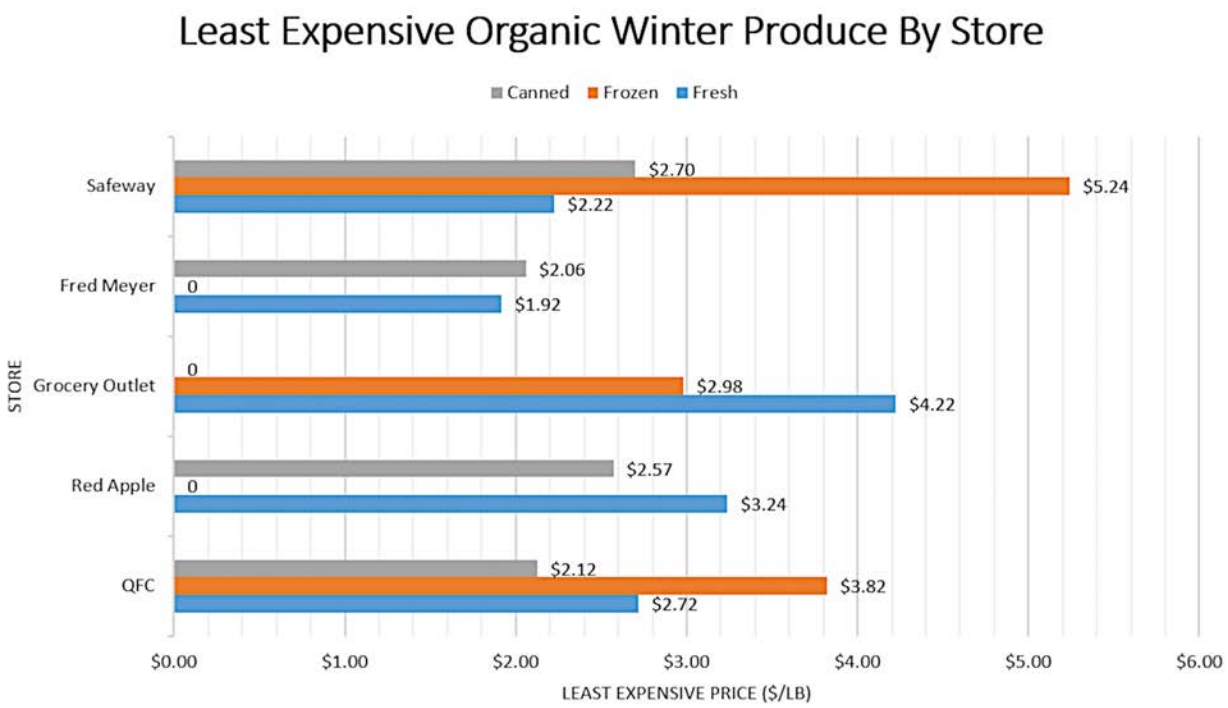


Figure 9

Figure 9 depicts the price comparison of the least expensive organic fresh, frozen and canned produce items from all SMs. Safeway represents the average of least expensive produce items from all four Safeway stores that were assessed on the Tool. The (0) listed next to Fred Meyer, Grocery Outlet and Red Apple denotes that there were no produce items in store during the assessment that met the SNAP requirements or were specifically identified by the Tool.

Each bar depicts the average price for the least expensive item from all organic produce items; they do not compare the same produce item. Overall, QFC offered the least expensive price for organic produce when considering all fresh, frozen, and canned versions. While Red Apple and Fred Meyer had lower prices on average, neither store offered frozen organic versions of items in this study.

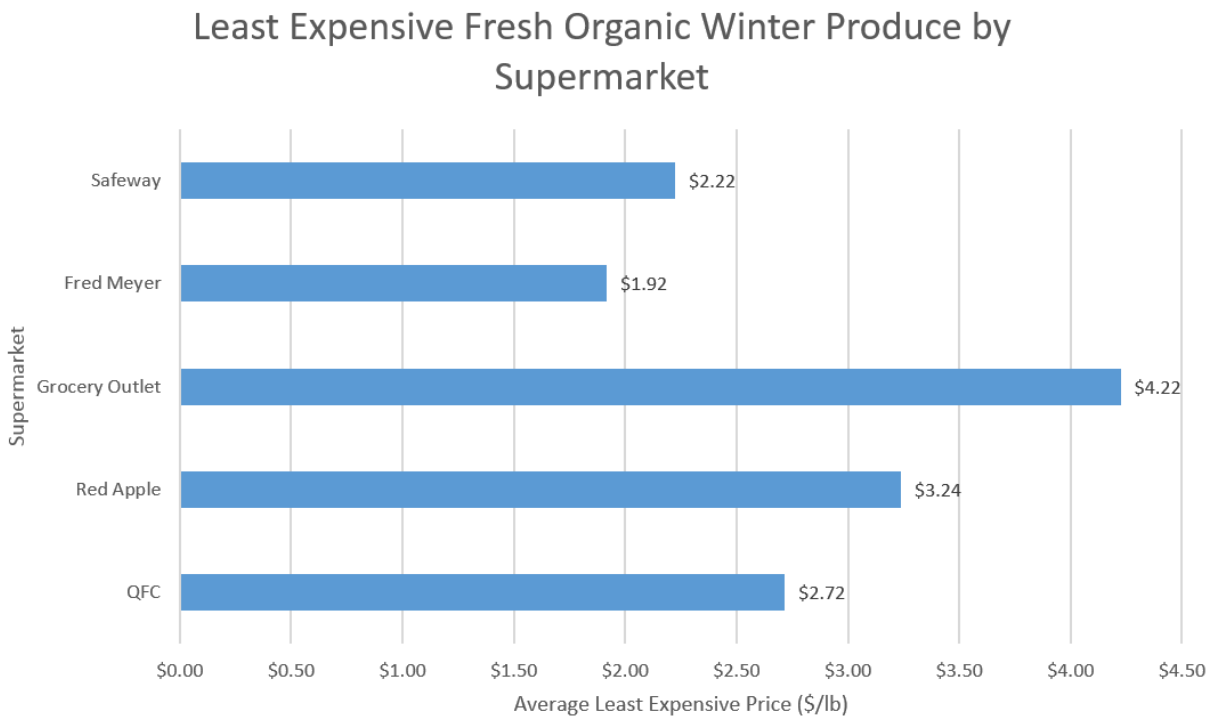


Figure 10

Figure 10 depicts the price comparison of the least expensive organic fresh produce from all SMs. Safeway represents the average of least expensive produce items from all four Safeway stores that were assessed on the Tool.

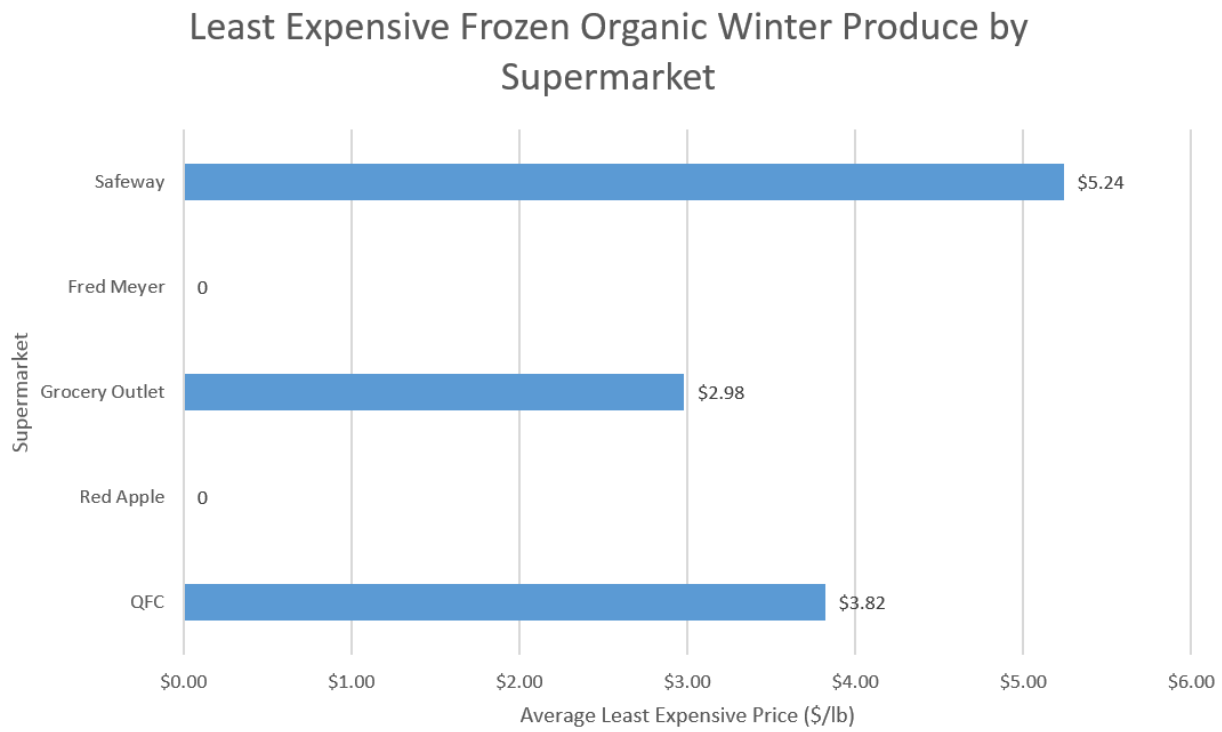


Figure 11

Figure 11 depicts the average cost of the least expensive organic frozen produce item from all SMs. Safeway represents the average of least expensive produce items from all four Safeway stores that were assessed on the Tool. The (0) listed next to Fred Meyer and Red Apple denotes there were no organic frozen items at the store during the assessment.

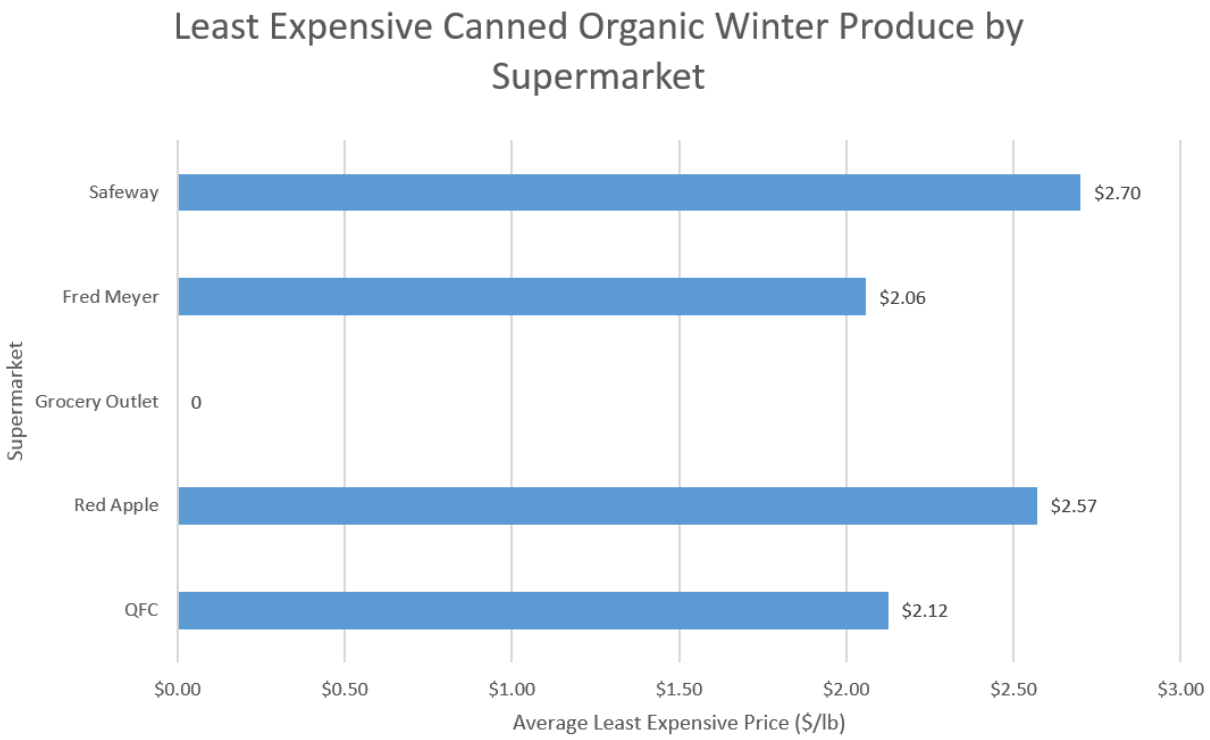


Figure 12

Figure 12 shows the average cost of the least expensive organic canned produce item from all SMs. Safeway represents the average of least expensive produce items from all four Safeway stores that were assessed on the Tool. The (0) listed next to Grocery Outlet denotes there were no organic canned items at the store during the assessment. (Note: Grocery Outlet's stock rotates frequently.)

Conventional Winter Produce in King County Supermarkets and Farmers Markets by Least Expensive Option in Price per Pound

	Farmers Market (fresh)	Supermarket (fresh)	Canned	Frozen
Apples	$2.12	$1.21	$1.15	$5.50
Pears	$2.24	$1.47	$1.89	
Potatoes	$1.66	$0.35		$1.22
Carrots	$2.50	$0.72		$1.45
Mushrooms	$50.00	$3.90		
Onions	$1.79	$0.77		$1.94
Squash	$1.50	$1.10	$2.09	$1.65
Kale		$2.64		$3.06
Collard Greens	$2.50	$2.14		$1.73

*A grey box indicates no option was available
** Red numbering denotes the least expensive option

Figure 13

Figure 13 depicts the price difference between least expensive conventional items at both FMs and SMs (exception: applesauce) for each category of produce on the Tool. When comparing the prices of produce items at FMs and SMs, the lowest price is highlighted in red. A shaded box signifies that the produce item that was not sold when the assessment was conducted. There was limited data on canned items because many of the options were excluded from the assessment due to added salt, sugar, fat. There was also limited data on frozen items due to processing or packaging of multiple varieties together. When comparing prices of similar produce items between FMs and SMs, FMs produce was $0.36 USD (collard greens) to $46.10 USD (mushrooms) more expensive than SMs.

Organic Winter Produce in King County Supermarkets and Farmers Markets by Least Expensive Option in Price per Pound

	Farmer's Market (fresh)	Grocery Store (fresh)	Canned	Frozen
Apples	$1.75	$2.38	$2.41	
Pears	$3.00	$2.12	$2.12	
Potatoes	$1.38	$1.69		$4.78
Carrots	$2.90	$1.24		
Mushrooms		$5.27		
Onions	$2.25	$1.55		
Squash	$1.19	$1.45	$2.87	$4.78
Kale	$3.00	$4.39		$3.95
Collard Greens	$3.25	$2.69		$6.73

*A grey box indicates no option was available
** Red numbering denotes the least expensive option

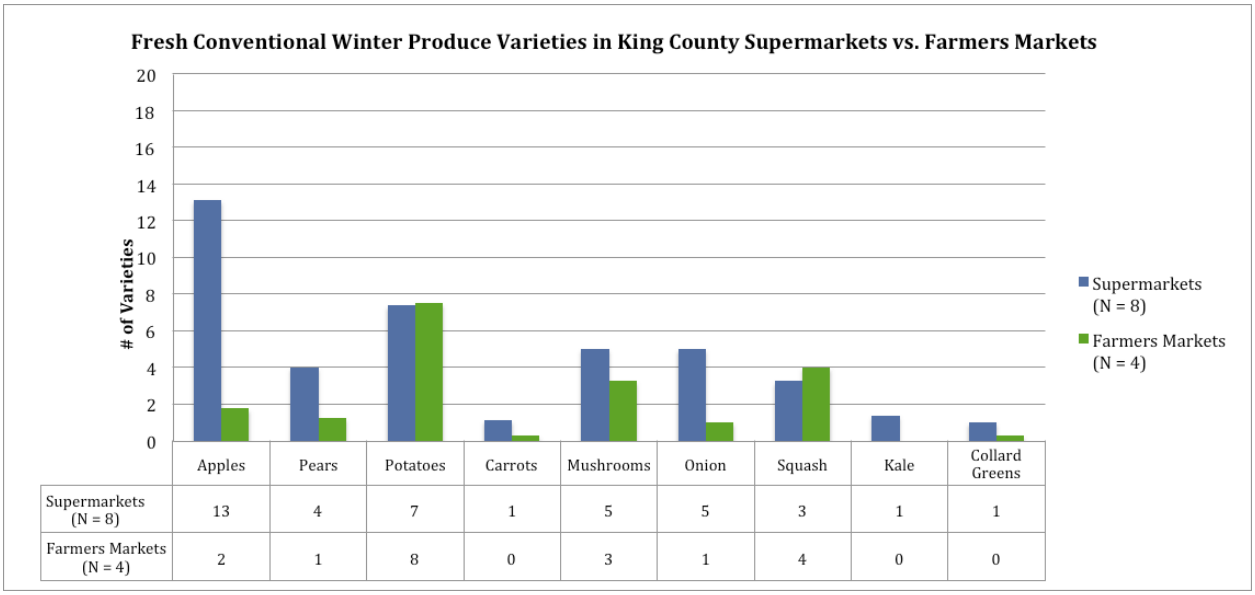
Figure 14

Figure 14 depicts the price difference between least expensive organic items at both FMs and SMs for all produce categories on the Tool. The lowest compared price is highlighted in red. A shaded box signifies that the produce item was not sold when the assessment was conducted. Canned and frozen represent prices found only at SM. When comparing the prices of similar produce items between FMs and SMs, FMs produce was $0.26 (potatoes) to $1.66 (carrots) more expensive per pound than SMs.

Variety

Comparing SMs and FMs, the variety of fresh produce items offered differed according to conventional or organic. Overall, there was a greater variety of conventional fresh produce items offered at SMs compared to FMs. The variety of organic fresh produce items offered at SMs and FMs markets was comparable. A wide range of varieties of both conventional and organic fresh produce items between FMs and SMs at comparable locations was observed.

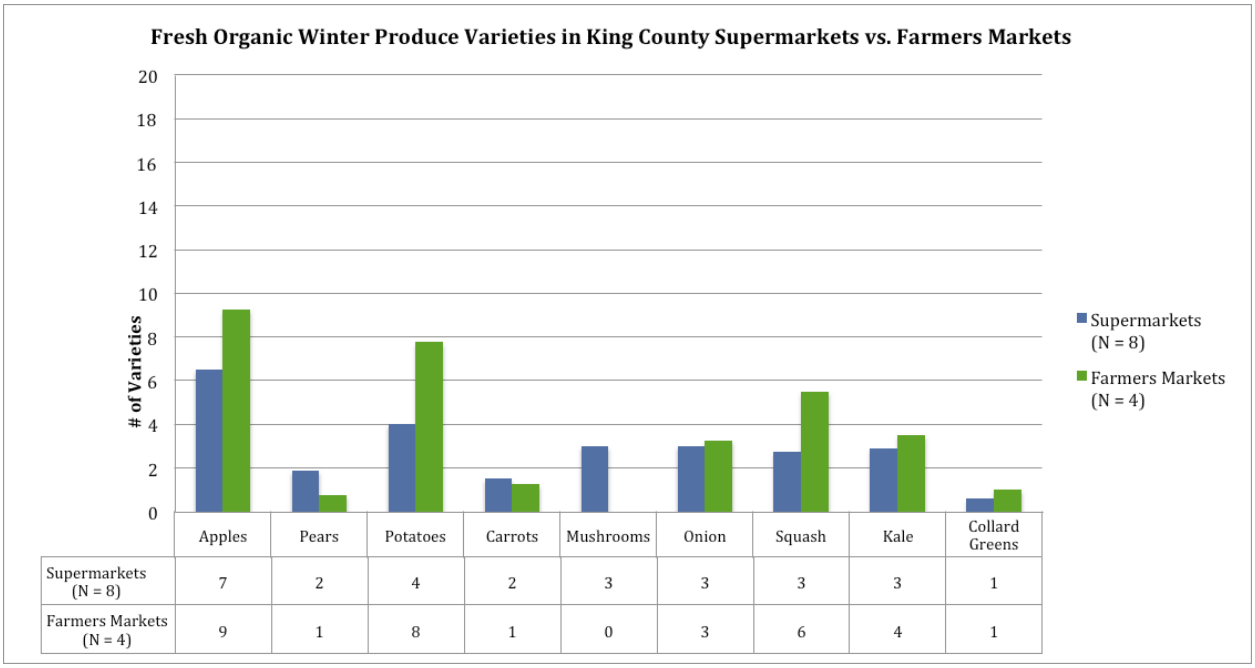
Variety of fresh winter produce items at Farmers Markets versus Supermarkets



	Apples	Pears	Potatoes	Carrots	Mushrooms	Onion	Squash	Kale	Collard Greens
Supermarkets (N = 8)	13	4	7	1	5	5	3	1	1
Farmers Markets (N = 4)	2	1	8	0	3	1	4	0	0

Figure 15

Figure 15 depicts the average number of varieties in each category of conventional fresh F&V, when comparing all FMs and SMs. On average, SMs offered a greater variety of conventional produce than FMs; the two exceptions were potatoes and squash. Conventional kale was not sold at any of the FMs and conventional collard greens were only sold at one FM. In total, there were four conventional produce items not sold at every FM assessed, whereas there was only one conventional produce item not sold at every SM assessed. There was a wide range in the number of produce varieties offered between FMs and SMs; some retailers sold more than five times the variety in a given category than at another comparable location.



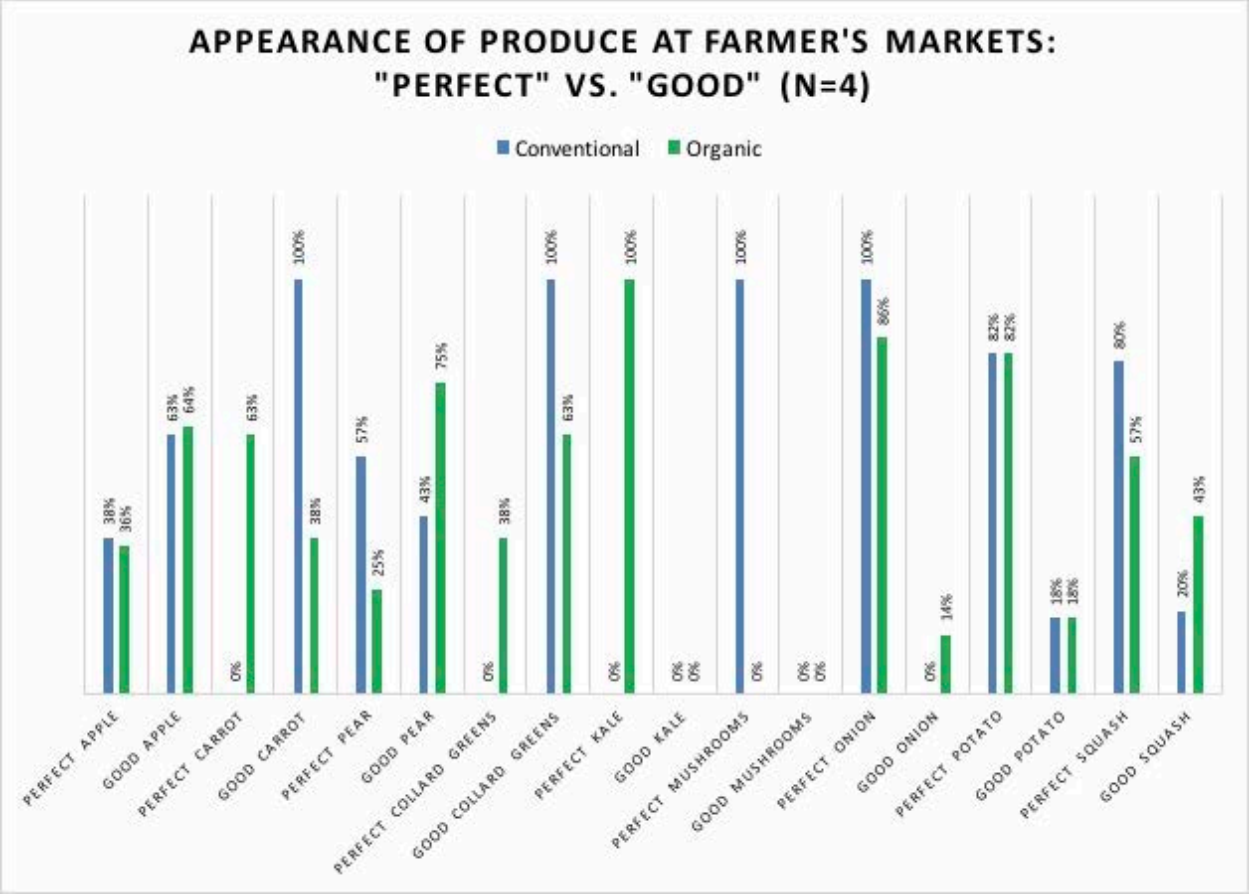
	Apples	Pears	Potatoes	Carrots	Mushrooms	Onion	Squash	Kale	Collard Greens
Supermarkets (N = 8)	7	2	4	2	3	3	3	3	1
Farmers Markets (N = 4)	9	1	8	1	0	3	6	4	1

Figure 16

Figure 16 depicts the average number of varieties in each category of organic fresh F&V, when comparing all FMs and SMs. On average, SMs offered a greater variety of organic pears, carrots, and mushrooms, whereas FMs offered a greater variety of organic apples, potatoes, squash and kale. No FMs sold organic mushrooms. In total, only two organic produce items were not sold at every FM assessed, whereas five organic produce items were not sold at every SM assessed. There was a wide range in the number of varieties of organic produce offered between FMs and SMs; some markets or stores sold more than five times the variety in a given category than at another location.

Quality

Quality was rated by appearance. Overall appearance of both fresh organic and conventional F&V was better at SMs compared to FMs. Appearance was rated on a scale of " Perfect", "Good", or "Poor". All SM conventional F&V received a "Perfect" rating. The majority of FM F&V received a "Good" rating; the majority of these were due to the presence of dirt on the produce item. No F&V at either SMs or FMs received a "Poor" rating.



FARMER'S MARKETS (N=4)		
Produce	Conventional	Organic
Perfect Apple	38%	36%
Good Apple	63%	64%
Perfect Carrot	0%	63%
Good Carrot	100%	38%
Perfect Pear	57%	25%
Good Pear	43%	75%
Perfect Collard Greens	0%	38%
Good Collard Greens	100%	63%
Perfect Kale	0%	100%
Good Kale	0%	0%
Perfect Mushrooms	100%	0%
Good Mushrooms	0%	0%
Perfect Onion	100%	86%
Good Onion	0%	14%
Perfect Potato	82%	82%
Good Potato	18%	18%
Perfect Squash	80%	57%
Good Squash	20%	43%

Figure 17:

Figure 17 depicts the proportion of organic versus conventional produce items at FMs that earned "Perfect" and "Good" quality ratings. Compared to SMs, there was a higher proportion of FM produce that received "Good" ratings versus "Perfect" ratings. Of the FMs assessed, none of the produce received a quality rating "Poor".

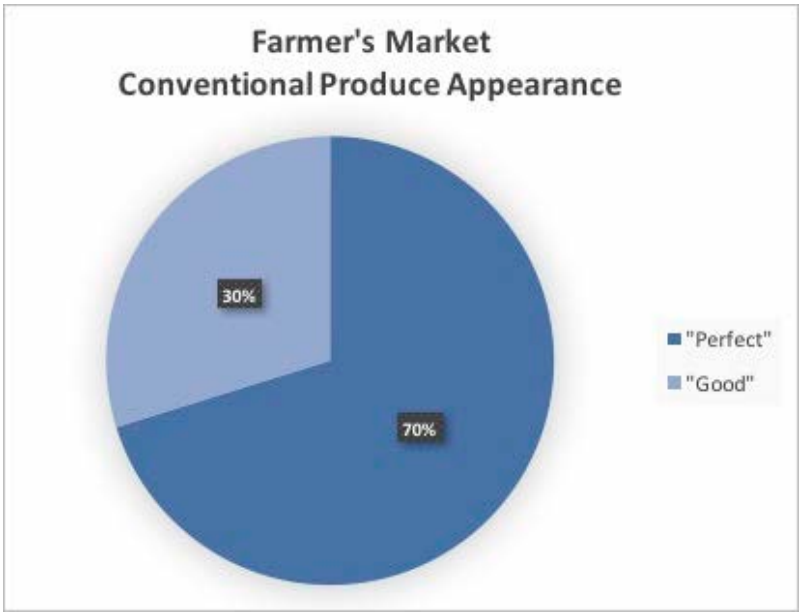


Figure 18

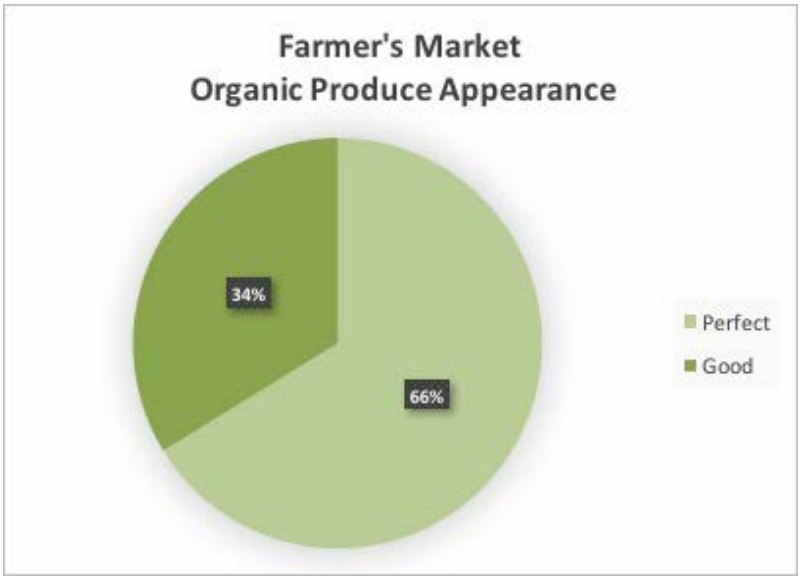


Figure 19

Figures 18 and 19 depict the quality rating comparison for conventional and organic produce at FMs. Overall appearance ratings were slightly better for conventional produce at FM compared to organic produce.

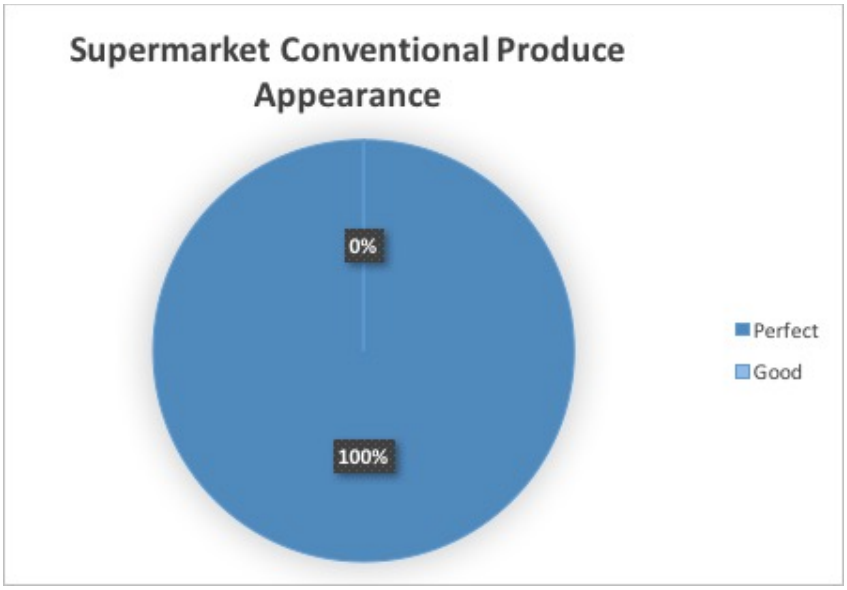


Figure 20

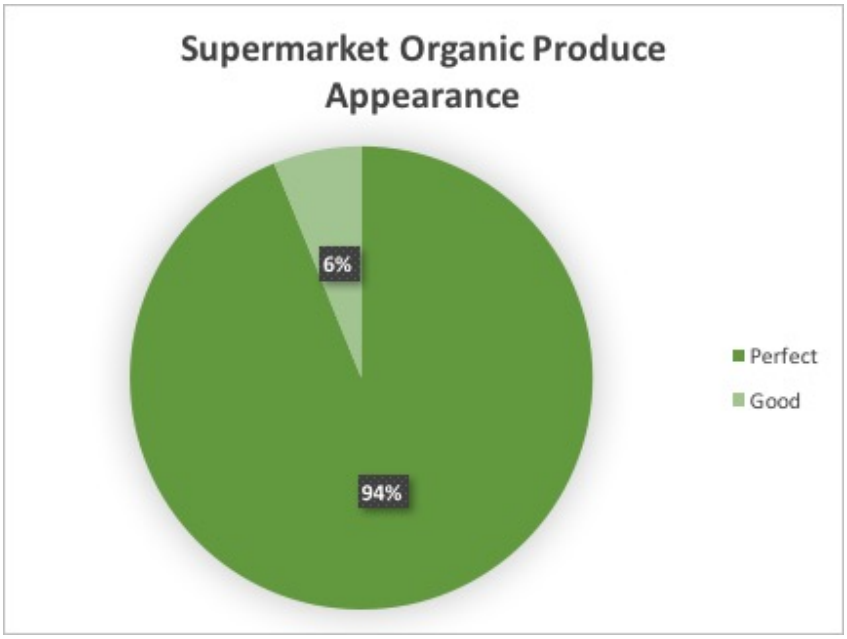


Figure 21

Figures 20 and 21 depict the comparison of appearance between conventional and organic SM produce. Overall appearance ratings were better for conventional produce at SMs compared to organic produce.

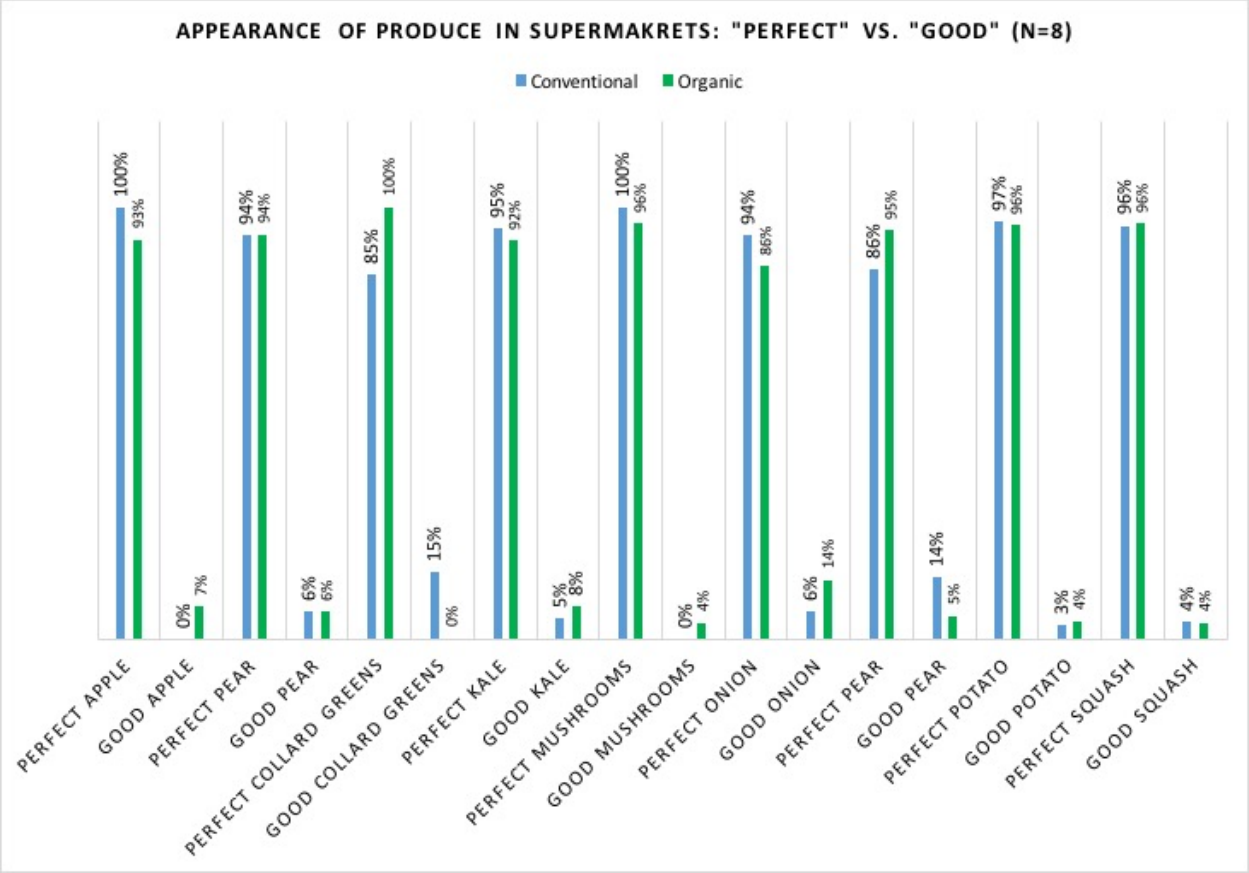


Figure 22

SUPERMARKETS (N=8)		
Produce	**Conventional**	**Organic**
Perfect Apple	100%	93%
Good Apple	0%	7%
Perfect Pear	94%	94%
Good Pear	6%	6%
Perfect Collard Greens	85%	100%
Good Collard Greens	15%	0%
Perfect Kale	95%	92%
Good Kale	5%	8%
Perfect Mushrooms	100%	96%
Good Mushrooms	0%	4%
Perfect Onion	94%	86%
Good Onion	6%	14%
Perfect Pear	86%	95%
Good Pear	14%	5%
Perfect Potato	97%	96%
Good Potato	3%	4%
Perfect Squash	96%	96%
Good Squash	4%	4%

Figure 22 depicts the proportion of organic versus conventional produce items in SMs that were rated “Perfect” versus “Good”. More than 85% of all organic and conventional produce items received a “Perfect” rating.

Sourcing

The majority of organic and conventional winter produce in Seattle SM were sourced from within the United States. Just over one-fifth (21%) of conventional produce in SMs was sourced from within Washington State. Just under one-quarter (23%) of organic produce in SMs was sourced from outside of the country (primarily produced in Mexico and Canada). All produce from FMs was sourced from within Washington State.

It was often difficult to assess the product origin within SMs. Produce labels did not always list origin and sticker labels were sometimes missing, as sticker labels easily peel or fall off. Sometimes produce was mislabeled, would have items from multiple locations, or researchers were unable to identify. Overall, determining source was far more challenging in SMs compared to FMs.

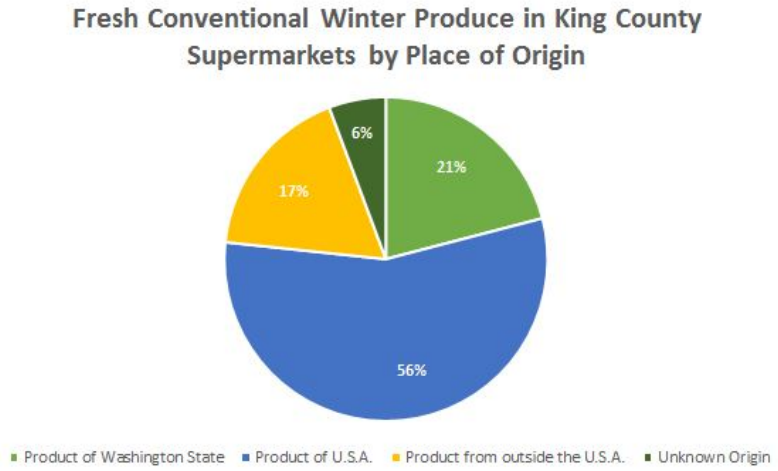


Figure 23

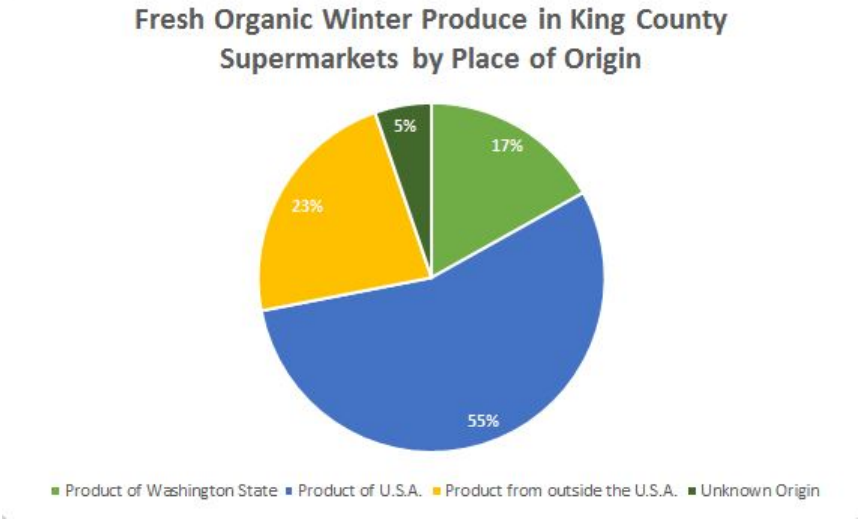


Figure 24

Figures 23 and 24 depict sources of conventional and organic fresh winter produce from all SMs assessed.

Merchandising Strategies

The most common merchandising strategy in both SMs and FMs was the use of labeling, with 99% of produce in both SMs and FMs labeled. Promotional signage was also commonly utilized in both SMs and FMs. In SMs, promotional signs commonly used the words "fresh," "local," or "organic." At FMs, promotional signs commonly used the words "no GMOs," "organic," and "no chemicals," in addition to descriptions of produce variety and preparation suggestions. In SMs, 81% of eligible canned and frozen produce was shelved at eye level. Additionally, several fresh items in SMs contained a recipe on their packaging. In FMs, recipes featuring produce were not observed, but vendors offered taste testing for 10% of recorded items.

A manager's tent was observed at each FM. Manager's tents typically sold market-related merchandise (such as t-shirts) and offered information related to EBT use at FMs and the Fresh Bucks program. FM employees were welcoming and willing to provide customer service, such as explaining how Fresh Bucks works. The researchers observed that signs promoting EBT acceptance and Fresh Bucks use differed among the FMs; the U-District FM had a chalkboard sign in a high traffic area, while other FMs had less prominently displayed EBT signs at the manager's tent only.

Key Informant Interviews

Four SM produce managers participated in the key informant interviews. Two prominent topics that emerged during the interviews were store values and customer values. Key findings from these interviews are presented below.

Overarching Themes

Four of the ten key information interview questions were related to store and customer values. Answers to these questions have been consolidated and summarized to highlight common findings.

Store Values

Three of the four SMs reported placing high value on buying locally and that they often pursued buying local as a marketing approach. One retailer reported placing emphasis on supporting local farmers and maintaining relationships with these farmers. In some cases, however, buying locally was seen as a barrier because it sometimes presented issues with quality and reliability. One store chose to prioritize organically grown produce over locally grown produce because of the store's niche market. All stores reported buying more from local sources in the summer.

Produce managers noted that their SM tends to stock organic products if it is cost-effective and if there is sufficient customer demand. Some produce managers believe that the costs of organic produce is an essential consideration because some of their consumers perceive organic produce as too expensive and will not purchase it. However, two of the stores interviewed focused more on stocking organic produce rather than conventional produce, regardless of pricing. Some stores also expressed that sourcing organic produce takes more effort in order to meet supply demands.

Customer Values

The most significant factors identified that influence customer purchasing decisions were price, seasonality, quality, and sourcing. Seasonality and weather patterns determine the stock and sourcing of produce departments, which subsequently influence quality and price fluctuations of the produce offered. This, in turn, may discourage customer purchases of specific items. Despite fluctuations in quality and price, three of the four store managers noted that shoppers still tend to buy the same items year round. In fact, they identified consumer demand for year-round produce as a driving factor for their produce variety.

The managers interviewed believed that customers tend to understand price fluctuations and often accept them for the sake of health benefits associated with fresh produce. However, shoppers with higher income are identified as more elastic in their response to price fluctuations. In terms of increasing the purchasing power of their customers, the produce managers expressed barriers to implementing marketing tactics such as digital coupons, as customers often express that they would rather see the price savings directly on the tag instead of expending extra effort to use coupons.

Two produce managers reported that customers typically care more about price than organic/locality status. However, at higher-end stores, buying organic and local is a very large priority regardless of price. Depending on neighborhood, this can also differ between stores that are part of the same chain. Customer interest in buying locally also depends on marketing within stores and whether or not a given produce item is in its peak season.

Other Questions Asked

This section highlights the remaining six key informant interview questions. Each question is stated, and answers for all four interviews have been consolidated and summarized.

Question 1

"What is the relationship of your store to FMs? Probe: Do FMs affect your sales in any way?"

Across the SMs interviewed, there was a consensus that the presence of FMs does not affect sales. Store managers felt that they either have no relationship, no strong relationship, or

have a good relationship with local FMs. Opinions on relationship varied by store. Produce managers also specifically stated that they do not have a problem with FMs because FMs are not permanent structures and are therefore not competitive. The produce managers interviewed are not concerned with FMs and approach them as a "supplemental" source of food, rather than a main source. One retail manager also commented that FMs are not an issue because they are "a completely different experience; people go to FMs more in the summer, but we also have [produce] available in the summer." Therefore, they feel no pressure to increase their availability or improve sales when compared to FMs. One produce manager also praised the efforts of farmers to diversify their selling behaviors by selling to SMs and participating in FMs to supplement their income.

Question 2

"How would you describe the average produce shopper in this area at a retail store compared to a FM?"

All produce managers interviewed commented that FMs are more of a specialty shopping place, instead of a one-stop shop. SMs feel that this gives them an advantage in the market compared to FMs because customers cannot rely on FMs to provide everything they need. One produce manager mentioned that "people go to FM for things that pique their interests, but don't buy their staples for the week" there. One manager stated that they felt secure in their customers' continued patronage due to their supply of sufficient organic and local foods.

Question 3

"Tell us about how your store merchandises fruit and vegetables. Probe: What about pricing strategies (coupons, discounts, buy-one-get-one deals, etc.?)"

All produce managers stated that efforts are made to make produce look as appealing as possible. Efforts include placing F&V at the entrance of the store to seem inviting, displaying bright colors in order to pique interest, placing sale items in front of regular priced items, frequently changing advertisements, and changing their produce selection according to what is in season. SMs make efforts to prominently display seasonal produce in the storefront and rotate in other F&V as they come into season. The stores also put an emphasis on making sure their shelves stay stocked to imply abundance and to improve visual appeal. One produce manager mentioned difficulties choosing strategies to price their produce because they were located near other large SM chains. They mentioned that when larger SMs are willing to push lower prices on conventional F&V, selling organic or local produce becomes more difficult for smaller food stores during that time. SMs that have been using paper coupons are shifting to more electronic-based coupons that make mobile device redemption easy.

Question 4

"What are some ideas that you have about increasing fresh produce purchasing among lower-income populations in your store?"

One SM produce manager put a significant amount of effort into supporting the availability and affordability of produce for lower income populations. This produce manager described at length the coupon and sales offered weekly for fresh F&V and that "[They] have really large sale signs that are a different color to catch the attention of the customer." This is in contrast to the other stores, which did not put as much effort into offering more affordable produce and were less focused on being value-based. This is seen as a large obstacle to overcome on both ends (retailer and customer). Although certain stores appear to be making decisions based on profit alone, a few specifically mentioned the role their corporate leaders play in creating sales and discounts. One store maintained that subsidies are a price issue because organic growers have to "shoulder most of their own costs, pay for certifications, and pay 4- to 5 times more for labor." Another store stated that they try to target specific ethnic groups and try to ensure that they offer produce their customers would normally have in their homes, regardless of price.

Question 5

"What are some ideas that you have about increasing organic produce purchasing among lower income populations in your store?"

One store maintained the idea that the biggest factor influencing purchasing was having fresh produce in stock. They believed that stocking organic as well as pricing competitively would increase purchases of organic produce. They stated that with a higher customer demand, the lower the item price. This store also stated that lower income customers choose their store, so it is not the responsibility of stores to change customer purchasing habits. Furthermore, they stated the availability of SNAP should make it easier for low income individuals to purchase organic produce. Lastly, they stated that if organic produce is on sale, purchasing by these individuals will increase. One store did not answer the question asked, and another store believed increasing the variety of F&V would allow for better sale prices, leading to increased participation among lower income individuals. This same store projected a goal to "keep prices of organics low and get [profit] through volume."

Question 6

"What else should I be asking you?"

Another store thought that the best way to address the issue of food availability for lower income individuals was to establish SMs in food deserts, or in locations where F&V are not readily available. They mentioned the mobile produce shop, called My Street Grocery, as a

possible solution to the issue of low F&V purchasing habits of lower income individuals. My Street Grocery works with Whole Foods Market to bring produce into communities by van services; it is currently located in Portland, Detroit, Chicago, and New Orleans.

One store mentioned food waste as a concern because customers are unwilling to buy produce unless the display is full. They also hope that everyone will begin to understand the cost of each step required to sell produce in stores (labor, farming, farmland, etc.) and how these components affect prices. Another store mentioned that they are able to supply more organic produce at a lower price since they are in a high-demand neighborhood made up of both high and low income customers. Although pricing strategies immediately help the consumers buy F&V, one store believes that increasing education on the benefits of eating F&V would increase the amount purchased by lower income individuals.

CONCLUSION

The main findings of this study suggest that conventional fresh produce from SMs is lower cost, better appearance , more available and more convenient than similar produce items at FMs. Produce from SMs is also less likely to be locally grown and SM managers shared concern about the quality of local produce.

The findings suggest that SNAP participants residing in areas with FMs may have adequate access to FMs and SMs. SMs were located within two miles of each of the four year-round FMs, and the average distance between FMs and SMs was only one mile. These FMs were located in higher income neighborhoods, with the exception of U-District.

This study found that on average fresh produce was more expensive at FMs than SMs and that cost is a significant factor for SNAP participants. This study supports perceptions of price differences among SMs, between FMs and SMs, and between organic and conventional F&V. SM interviews suggest price may be a more important issue to shoppers at mid-price SMs.

Though both fresh and frozen tended to be more expensive, literature suggests that efforts to increase F&V consumption of SNAP participants should focus on these items because of their improved shelf life. SM assessment results suggest that canned vegetables typically contain added salt and sometimes fat, while canned fruit typically contains added sugar.

Discussion

Cost

The observed differences in prices among SMs supports an earlier SM basket study conducted in the Seattle area which found Safeway and QFC to have similar, mid-range pricing and Fred Meyer to have significantly lower pricing.[9] As discount SMs, both Red Apple and Grocery Outlet had similar pricing to Fred Meyer. The similar pricing between Safeway stores is consistent with literature suggesting prices by store are consistent regardless of the area's SES.[40]

Seattle FM organic prices seemed to be competitive, but slightly higher than SM prices, while conventional produce was consistently and significantly more expensive. These higher costs may support the SM manager perception that FMs are used for special item purchases that supplement the household's' grocery needs. FMs may need to be subsidized through incentives if they are to be an affordable option for SNAP participants. This is not strongly consistent with existing literature. Similar studies conducted in spring and summer have suggested that FM organic F&V ranges from significantly less expensive to competitive when compared to SM organic F&V.[3,58–61] Comparison between conventional FM produce and SM

prices have found conventional FM produce to be slightly less expensive to competitive when compared to SMs.[58,61]

Higher costs at FMs may be attributed to the seasonality of this study. Unlike most other studies with similar objectives, this study was conducted in winter. Less F&V available in winter and less vendors participating could create higher demand and prices for some specific items or all items as a whole. Thus, the produce items included in this study may reflect higher prices associated with winter produce in Washington State due to the smaller amounts of in-season produce and higher demand. By sourcing nationally and internationally, SM may be able to alleviate these constraints and provide less expensive options.

The higher cost of FM F&V in this study may also be attributed to the binary classification systems, which assigned all produce as either conventional or organic according to vendor certification. However, many of the vendors at the FMs stated that organic growing practices were used and charged similar prices as organic items, even though the produce was not USDA certified organic. By the methods of this study, this non-certified organically grown produce was designated as conventional produce, as there was no way to confirm growing practices. This may skew the prices of conventional produce items from FMs to be too high and erroneously categorize these organically grown items. Creating a new category for self-reported, non-certified organic produce would help to reduce this possible price inflation and less accurate designation of FM produce in future studies.

Despite the potential for promoting relatively shelf-stable frozen and canned goods to increase F&V purchases among SNAP participants,[13] our findings suggest that both are usually more expensive per pound. Higher prices may reflect the costs of processing for these foods but the cost difference for processed F&V may be less pronounced than the study suggests. These higher costs do not consider the reduction of inedible food weight (such as cores and pits) or increased density of the processed foods. For example, frozen products are typically in the ready-to-eat or pre-prepared form, so food scrap weight following processing was not included in the frozen package weight. Canned items may also be packaged in water or juice. Thus, serving size and/or processing weights should be considered in future studies. Furthermore, this study only considered the prices of certain frozen and canned items and did not include F&V combinations or medleys. Last, it is possible that certain foods may be less expensive in a frozen form than fresh or that they may be less expensive during different parts of the year.

Appearance

This study found that FM produce sometimes had a lower appearance rating than SM produce. In addition, SM managers reported sourcing less locally in the winter and shared concerns about availability and quality of local produce. These findings support SNAP

participants' perceptions that FM produce that appears dirty is lower in quality.[2,14] Both literature and SM interviews emphasize the importance of unblemished, uniform produce.[52] Though appearance ratings were slightly lower at FMs, this study was only able to evaluate appearance of produce and did not consider taste, firmness, ripeness, or nutritional quality of F&V. The current food industry standard of uniform conventional produce causes 6 billion pounds amounts of "ugly vegetables" to be thrown away every year.[62] FM vendors and growers may value the produce item as a whole, recognizing that quality extends beyond physical appearance. Expanding quality assessment to include taste, firmness, ripeness, and nutrient content would be beneficial and may help to show the true quality of produce items, not just appearance. In addition, this concern must be balanced with literature that suggests that SNAP participants may overlook appearance if the produce is perceived to be fresh and affordable.[19,28] It cannot be concluded that this slightly lower appearance rating would discourage or encourage SNAP participants from shopping at FMs.

Variety/availability

Produce items included in this study represent F&V grown or available in Washington State during winter months. The number of produce items available in the winter season is known to be smaller compared to other seasons. Even when only considering in-season produce, this study suggests a greater availability of produce at SMs versus FMs. This supports the perception among SNAP participants that FMs are less convenient to shop at because they and have an inadequate variety of produce.[15,28]

All F&V at the assessed FMs was grown locally, and literature suggests that some SNAP participants may shop at FMs because of the availability of local produce.[19] Local produce was less available at SMs, though the proportions of produce sourced within Washington State, within the U.S., and outside of the U.S. were relatively similar for conventional and organic foods. There was a slight increase in the proportion of organic items sourced from outside of the U.S. compared to conventional at SMs. This could be due to a lack of large-scale organic producers within the United States. Perhaps this would change if opportunities for SMs to source organic items locally were presented or desired. Organic prices were competitive among SMs and FMs, and SMs did carry some organic items at lower prices than conventional, so there may be benefit for SMs to source organic produce locally instead of internationally. The fact that SM organic produce was from outside of the U.S. may explain the higher prices of some organic produce items at SMs compared to FMs.

This study supports literature suggesting that FMs tend to not be located in low income neighborhoods.[14] Three of the year-round FMs available for study were located in affluent neighborhoods, with less than 17% of residents below the poverty level.[63] The exception to this was the University District FM, which houses a significant proportion of full-time students with

low incomes, even though they do not tend to be SNAP participants. The lack of markets available in lower SES areas with high SNAP populations, especially in South Seattle, may influence F&V availability, but this area was not considered in the study. The role of ethnic markets, especially in South Seattle, might fill a niche for F&V access. The lack of year-round FMs in these areas may also show that they are not undergoing significant gentrification, though it should be noted that the increasingly gentrified Columbia City in South Seattle does have a part year market.[64]

Limitations

Study Design

This study was developed and conducted over a period of ten weeks. Each provider was only assessed once and therefore findings represent only a snapshot of price, variety and appearance. Several FM vendors commented that their produce prices fluctuate on a weekly basis and are dependent on availability, seasonality, and size of produce items. One vendor remarked that the price of pears per pound for that week was adjusted because the pears were larger than normal.

Cost

Some of the limitations of the study lay in the methodology of data collection. There were inconsistencies in standardization of bunched produce prices and size of produce items, and thus there is potential for error. FM mushroom prices were estimated using an online tool that may not have been accurate. Though bulk items were often least expensive, they were not labeled as a separate category. This may assume that the SNAP participants can afford to buy in bulk.

Quality

Multiple researchers were assigned to each location and the groups worked separately. One group solely assessed FMs and the other group solely assessed SMs. This may lead to inconsistencies in produce comparison due to human variability. Though researchers were trained, assessment of appearance was subjective. This research was further limited by assessment in quality only based on the physical appearance of produce in both SMs and FMs. We did not record data related to produce storage duration, shipping conditions, taste, scent, or other sensory measures. Frozen and canned goods were not assessed for appearance though addition of added salt, sugar and fat was noted.

Availability/Convenience

Consideration of accessibility did not take into account actual number of bus routes serving the area, which would give a better picture of transportation flow. Only a small number of the SM within 2 miles were assessed. Selection of SM could influence the price, availability and quality of produce. SM availability may change quickly and during the time of this assessment Red Apple was purchased by a large developer to construct a mixed-use housing development.[69]

This study also assumes that neighborhoods with a high number of SNAP recipients have access to FMs, though it is known that at least four Seattle low income neighborhoods lack a FM within their immediate community and there is no year round city markets in lower income neighborhoods in South Seattle or North Seattle.[65,66]

Store Atmosphere

Produce managers were not interviewed about the perception of non-SNAP customers on SNAP participants. This information may have helped gain a better understanding of the roles stigma and discrimination play in store, and how this may affect SNAP participants' purchasing behavior.

Recommendations

- ➔ Consider expanding FINI incentives to include more supermarket, superstores, discount grocery stores especially low-cost retailers.
- ➔ Promote purchase of frozen F&V given that these foods are convenient, have a longer shelf-life and limited additives
- ➔ Provide in-store labeling and signage around incentive-eligible items and consider expanding educational opportunities that promote increased F&V purchases and cooking
- ➔ Increase visibility of EBT-acceptance signs and SNAP-friendly marketing strategies at FM for greater recognition among participants.

Given SNAP participants concerns around cost,[8,13–18,20,12] convenience,[2,14,43,12] availability [15,28] and this study's results showing that SMs tend to be less expensive, FINI program should concentrate incentive efforts at SMs. Food access initiatives, such as the FINI grant, have been shown to increase F&V purchase and should continue supporting affordability through cost incentives for F&V purchases.[13,16,21,23–25] Given pricing differences between SMs[9] and the

preference for convenient one-stop shopping,[2,14,43,12] FINI incentives should expand to include low-cost supermarkets, superstores, and discount outlets such as Fred Meyer.

Program planners should consider potential obstacles to canned and frozen F&V purchases due to the FINI program's restrictions around food additives. Given the current monthly SNAP benefits distribution model and corresponding shopping patterns, prolonged shelf-life of processed F&V may be a worthy avenue to promote F&V purchase.[1,27,31,55,56] However, many of these products were more expensive. In addition, the assessed canned items often had added sugar, salt, or fat and may not preferred by SNAP participants because they can be easily acquired via food banks.[29] Because of this, strong emphasis on canned goods inclusion as FINI incentive items is not recommended. Strong emphasis on frozen F&V is recommended as frozen items have good convenience, longer shelf life, and may not be as expensive as suggested by this study when limitations are considered. To counter the obstacles of eligibility restrictions for certain processed F&V, educating participants through in-store labeling of incentive applicable items, similar to the WIC program, may promote purchase.

Literature also suggests that both SNAP participants and public health professionals recommend increasing nutrition and purchasing education, especially on topics including inexpensive and convenient cooking, shelf-life extension, nutrition similarities of frozen foods, menu/grocery list planning, SM navigation, and shopping tips.[13,15–17,20,24,27,30,12] Review of nutrition education interventions have been shown to increase F&V consumption, though additional research is needed.[67] The FINI program may consider working with SNAP education programs to promote F&V purchase and could work with SM produce and frozen food managers to supply in-store educational materials about assessing fresh F&V quality or provide easy, low-cost recipes.

Though FM may not be the most effective avenues for promoting F&V purchase by SNAP participants, FMs are a part of the FINI grant and support local agriculture. Thus, FINI program planners must address barriers of culture and affordability at FMs.[14,68] FINI might work with FM to ensure that EBT-acceptance signs are clear and visible and SNAP-friendly marketing strategies are employed.[2,14,17] Hours, locations, and Fresh Bucks incentive programs should be marketed directly to SNAP participants.[14,17] In addition, FINI might consider how incentives can be offered in low-income areas such as South Seattle that lack markets and explore avenues for offering incentives at ethnic markets or small farm stands.[8,28]Gentrification is a growing issue in Seattle[64,69,70] and the connection between FMs and the perceived stigma around FMs must be considered.[54]

Future Research Focus

Future research should be expanded to spring, summer and fall to compare factors affecting price, quality and availability of F&V at SM and FM. Increased supply, variety and

availability of F&V during these seasons may cause different results. Further research should also consider pricing analysis and classification. F&V price analysis could be expanded to consider bulk pricing, sale pricing, vendor-based loyalty pricing, and exclusion of food scrap weight. Incentives offered at FM and Safeway through the FINI program are not the same and a comparative study considering cost implications for these incentives may guide program planners. Non-certified organic produce prices should be considered as an independent category. Further research should expand beyond cost, availability and perceived quality of appearance; it should include convenience, social perception and a more robust quality assessment.

The SNAP participant perception of stigma and discrimination at FM and SM warrants further investigation. Expanding qualitative assessment to include point-of-sale workers and non-SNAP customers' perceptions may more substantively address this concern. These assessments could additionally include neighborhood-level perceptions of residents that live in close proximity to SMs and FMs. Effectiveness of alternative farmer-to-consumer programs, such as Good Food Bags or other Food Hub delivery programs may be an alternative to FM incentives and could play an important role in increasing F&V access for SNAP participants.[71]

With fresh F&V accounting for nearly 20 billion pounds of produce wasted each year, food banks may help ensure fresh F&V access among low income households by working with farmers and stores to redistribute this produce.[72,73] This will entail new systems and training, however some food banks have piloted such programs, including the *Feeding America National Produce Program* and *Capital Area Food Bank* in Washington, D.C.[74] With thousands of SNAP participants relying on food assistance when their benefits run out, these strategies may play a large role in increasing F&V access and consumption.

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