April 2018

The South Sound Food Processing Facility Project

A Market Assessment for a Regional Value-added Food Processing Facility

Stephen G. Bramwell
WSU Thurston County Extension
Agriculture Extension Agent

Sydney Debien
WSU Thurston County Extension
Research Technician

Thurston County
WASHINGTON STATE UNIVERSITY EXTENSION

Port of Olympia

Olympia FARMERS MARKET

South Sound FOOD SYSTEM NETWORK

EDC THURSTON COUNTY

Table of Contents

Introduction

In 2017, the WSU Thurston and Lewis County Extension programs completed a farmer needs assessment. One of the issues identified by farmers were gaps in the South Puget Sound's food system infrastructure, specifically around facilities to create and process value-added fruit and vegetable products (Bramwell et al. 2017). Farmers expressed a need for facilities such as frozen storage, food processing facilities, and warehouses for aggregation, distribution, and collective marketing. The full needs assessment is available at the WSU Thurston County Extension agriculture website.

The goal of the project described here was to address the needs outlined in the assessment by evaluating the potential of value-added market opportunities for fruit and vegetable producers in south Puget Sound through development of a facility for processing organic, locally-grown, and origin-identified fruits and vegetables. The project intended to test several assumptions:

1. Institutions and current customers of box subscription programs in south Puget Sound are interested, and are willing to pay a market premium for origin-identified products, at volumes that would justify a facility capable of processing 1,000 lbs produce per day.
2. Frozen processing lines in other regions operate viably at a scale similar to that which would be most appropriate in this region, and provide a model to utilize in designing a facility and selecting equipment.
3. Specialization in frozen vegetable processing in the south Puget Sound region compliments, does not duplicate, and can benefit from food processing efforts in other areas.

Effort to test these assumptions consisted of three work areas:

1. Market analysis of (a) current customers of produce box subscription programs, (b) farmers' market customers, and (c) buyers at regional institutions such as schools and hospitals;
2. A frozen processing line evaluation was initiated to improve understanding of equipment needs, and;
3. Several processing facility site visits were conducted to assemble information on equipment, sales volume and pricing to provide an introduction to financial, operational and equipment options for a proposed south Puget Sound facility.

Results from the project will be contribute to a feasibility assessment initiated in 2019, and to eventually advise on possible investment in a processing facility. Ultimately the aim of this work is to increase and expand market access and opportunities for farmers in south Puget Sound, and more likely for farmers in Western Washington generally.

Why a Value-Added Frozen Processing Facility

The varied use, in recent years of 'local', 'natural', and 'farm fresh' branding by retailers, and consumer preference for one-stop shopping convenience is considered by some to be suppressing direct-to-consumer farm sales (Ujcic, personal communication, 2018; Vogel and Low, 2015). As a result, some communities have invested in value-added food processing infrastructure. This has included facilities to flash freeze vegetables and fruit, as a means of augmenting product variety and increasing sales at consumer-direct venues such as farmers' markets.

The team working on this project observed evidence of changes in consumer-direct sales in market data, and from agricultural economists, and farmers. For example, consumer-direct sales, such as through farm stands or box-subscription programs, increased by 8 percent nationally between 2007 and 2012 (1.7% annually), compared to 225% between 1992 and 2012 (11.3% annually; USDA, 1992; USDA, 1997; USDA, 2012a). Similarly, economists studying farmers markets have noted the 1.25 percent annual farmers market start-up growth rate between 2015 and 2017, compared to a 19 percent annual start-up rate from 1994 to 2015 (Ikerd, 2015).

Small to mid-scale vegetable and fruit producers in Southwestern Washington are among farmers and regional food system workers who have called for assistance in augmenting consumer-direct sales. Proposed strategies have included developing value-based supply chains, mid-scale aggregation and distribution systems, local food processing facilities, and other strategies (Day-Farnsworth, 2009; Feenstra and Hardesty, 2016; Nelligan et al., 2016).

Due to apparent interest that local farmers have in storage, processing, shared infrastructure, and aggregated distribution, as well as the existence of successful models elsewhere, we chose to focus initially on local, value-added frozen processing. Several features made frozen processing capacity compelling. Namely, it could:

- Likely serve farmers of all sizes in a scale-neutral way
- Provide a shelf stable (when frozen) product that could meet the needs of a wide variety of buyers
- Create an entirely new product for buyers committed to origin-identification
- Be sold through a mediated conduit (such as a local business, cooperative, or co-op hired broker serving regional institutions), or farmers could sell processed product back through their own marketing channels, and;
- Result in a facility that (with additional equipment) could be leased directly by farmers, other food entrepreneurs, or any meals program that would benefit from resource-sharing, co-location, and access to quick freeze capacity.

Market Analysis and Market Segmentation

The market analysis proposed by this project was completed through interviews of three distinctive markets, or market segments: institutional buyers, shoppers at a farmers' market, and customers of three produce box subscription programs. These three consumer types were targeted because they potentially represented three different price ranges, and certainly different purchasing volumes.

Generally, institutional buyers purchase large quantities of food at low prices, and customers subscribed to a produce box purchase small quantities of produce at a higher price. Farmers' market customers were thought to have purchasing habits similar to those of produce box subscribers, but the research team was interested to determine how these two market segments compared to each other. By learning more about the purchasing habits and values of these three groups, the project team sought to gauge the overall level of interest and demand for locally grown and processed foods in the region.

Past work by research teams evaluating the potential for processing facilities has indicated the difficulty of building a profitable processing operation with high-volume, low cost accounts (Voltz et al., 2012). Indeed, two of the three caveats noted in the report by Voltz et al. were that:

1. …schools [in the Whatcom School District] have tight budgetary parameters and access to low-cost subsidized food, and
2. There are already large and well capitalized businesses providing these items that can access this food on a year-around basis at a much lower cost than could be attained locally

In an effort to surmount these known limitations identified in past studies, one of the central assumptions of the current project is that market segmentation is likely critical to profitability. That is, a combination of different markets (with varying profit margins) are most likely needed to support a local food processing facility in ways that

a) increases market opportunities for farmers,
b) offers attractive prices, and
c) is adaptable to different scales of production and distribution.

Preparation of the survey tools was assisted by an advisory panel of six farmers who provided input on data collection objectives and question content and structure. Technical services were provided by the WSU Division of Governmental Studies and Services, which reviewed survey questions and design to ensure validity, and utilized social exchange theory to develop survey language. Each survey was reviewed by the WSU Institutional Review Board and determined to be exempt human subjects research.

Farmers Market Customer Survey

Dot surveys are often used to quickly and effectively collect data in a farmers market setting, where interviews and written surveys can be too cumbersome and time consuming to implement. Dot surveys can be part of a larger Rapid Market Assessment (RMA), or a stand-alone research effort. This dot survey focused on farmers' market customer's interest in locally grown and processed products, specifically to gauge interest in frozen fruit and vegetable products.

The dot survey was held at the Olympia Farmers Market on Saturday, August 11 from 10:00 AM to 3:00 PM. This market had previously conducted a RMA in 2017, and by holding the dot survey here the project team took advantage of a win-win opportunity to access the information and experience market staff gained from the 2017 RMA, while market staff would be able to use the survey results to learn more about their customer base.

The survey was set up at the north entrance of the market, by the main seating area and market office. This location was chosen for several reasons: the survey was visible and easy to access, the 2017 RMA dot survey had been conducted in this spot, and the majority of customers enter the market in this area (Donovan & Kinney, 2017). The team facilitating the dot survey included Extension staff, market staff, and community partners. There were at least two team members encouraging customers to take the survey while another provided some initial instructions to participants, and answered any questions they may have had.

Seven multiple choice questions were written on large easel pads and displayed on easels. The seven questions were a subset of those included in both the Institutional Buyer Interview and the CSA Customer Survey. Respondents used a strip of seven dot stickers with which to identify their answers for each question. Pad sheets for each question were replaced hourly to reduce potential bias, track responses by the hour, and create more space for responses. Approximately 551 customers participated

in the dot survey, but the number of responses was not the same across all the questions because some respondents skipped questions. The full survey can be viewed in Appendix A.

Survey Results and Discussion

Overall, several aspects of consumer preference, purchasing habit, and willingness to pay were documented as a result of this work. First, farmers' market customers found it to be quite important that locally processed foods use locally grown ingredients. Second, farmers' market customers were interested in purchasing locally grown and processed foods, including frozen products. Finally, farmers' market customers' willingness to pay reflected their values, and were willing to pay more for a locally grown and processed product.

One of the primary pieces of information we hoped to gain from this survey was the primary reasons that shoppers buy local foods. Many respondents commented that it was difficult to choose just one reason, as they felt several were equally important to them. Out of the responses, 32% selected freshness/quality as their main reason. Interestingly, 46% of respondents indicated that the main reason they bought local foods was to support the local food system (27% support local farmers, 20% support local economy), while almost no one chose price (1%) as the reason they buy local foods. The responses suggest that farmers' market customers may care about what types of businesses their dollars are supporting more than getting a deal for food items. This could be good news for the viability of a food processing facility in the region, as a facility will need to strike a balance between a good price for the local farmer and a good price for the customer, and there could be a higher price tolerance for this customer base.

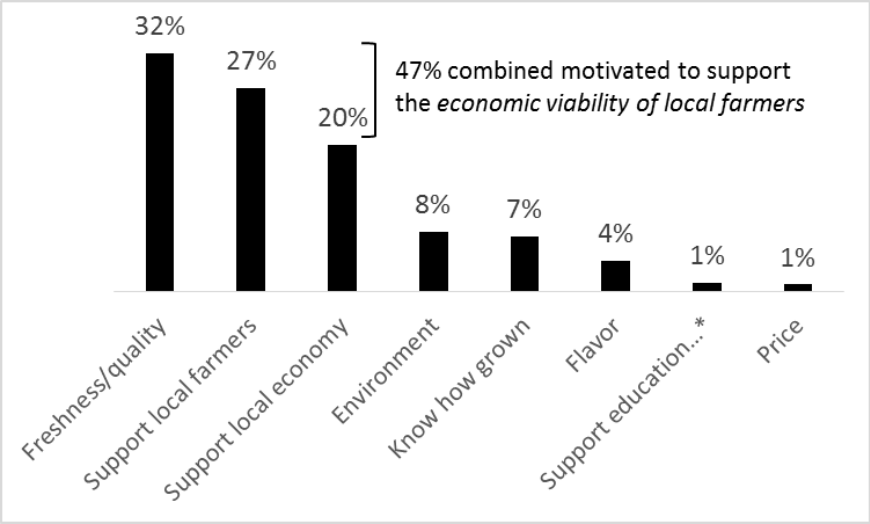

Figure 1. Respondents' primary reason for buying local foods.
*Support education on how food is grown

Another question posed to shoppers was 'How important is it to you that locally processed foods use locally grown ingredients. Among respondents, only 2% felt this was not important to them, and just 1% did not have an opinion. In contrast, 79% expressed that it was important or very important (38% important, 41% very important) to them that products processed locally, such as jams or pickles, used locally grown ingredients.

Frozen fruits and vegetables constituted the largest category of processed products purchased by survey respondents at the farmers' market. These were the most purchased processed products, with more

than two times the volume of shoppers (47 percent) purchasing these goods than the next most purchased product (22 percent), which was pickled/fermented vegetables. Jams or jellies were most purchased by 19 percent of shoppers, and canned fruits or vegetables by 12 percent. Similarly, frozen fruits or vegetables were the processed products that most shoppers most wanted to be able to purchase (38 percent), while pickled/fermented vegetables constituted a fairly close second at 29 percent (Figure 1).

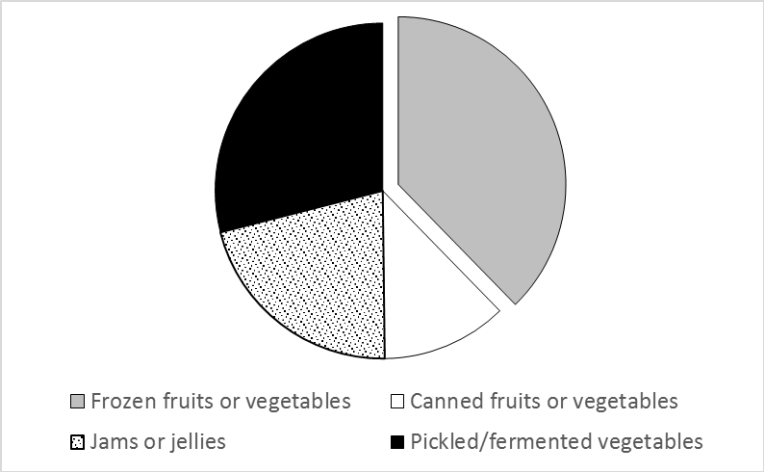

Figure 1. Value-added processed products that most shoppers most wanted to be able to purchase at the farmers' market.

Having determined processed product purchase habits and preferences, the team examined which frozen product shoppers would most like to buy. The frozen stir-fry veggie mix won the battle of frozen produce, with 31% of respondents selecting this product (Table 2). Frozen berries were also popular, as blueberries were in a close second with 22%, strawberries with 12%, and raspberries with 10%. Unfortunately for the other frozen veggie options, respondents did not seem particularly interested in them (peas 11%, broccoli 8%, green beans 5%, carrots 1%). These responses seem to bode well for farmers, as it suggests there is greater interest in the local frozen products that are typically more expensive for consumers and may have a larger profit margin for growers.

*Table 2. Frozen product that farmers' market shoppers would most like to buy**

Frozen vegetable or fruit product	Percentage of shoppers (%)
Stir-fry veggie mix	31
Blueberries	22
Strawberries	12
Peas	11
Raspberries	10
Broccoli	8
Green beans	5
Carrots	2

*It was noted on the flip chart that, *"All products are locally grown and locally processed"*

Determining willingness to pay was a central element to this effort. Consequently, shoppers were asked what they is the most they would pay for locally grown and processed frozen stir-fry veggies if non-local sitr-fry veggies cost A$3.50/lb at the supermarket. Respondents were asked to assume that both

products were organic. Respondents were asked to compare two organic products for a few reasons, the important being that organic products generally cost more than conventional products, and the team was interested in finding the absolute upper limit of what a customer would be willing to pay. This question's structure was based on question from a study investigating meat and poultry purchasing at Oregon farmers markets (Gwin & Lev, 2011). This question was asked in place of the Van Westendorp pricing questions included in the institutional buyer and CSA customer surveys. A similar question was also included in the CSA survey to compare the types of premiums these two customer bases were willing to pay.

Ninety-three percent of respondents were willing to pay some kind of premium for a local, organic frozen stir-fry veggie mix. Thirty-two percent would pay a dollar more per pound, 32% would pay $1.50 more, and 15% would pay $2.00 or more (8% would pay $2.00, 4% would pay $2.50, 3% would pay $3.50 more; Figure 2). Looking at responses in a different way, 32% were willing to pay a 29% premium and 32% were willing to pay a 43% premium.

Figure 2. The most respondents would be willing to pay for one pound of a local, organic frozen stir-fry vegetable mix.

CSA Subscriber Survey

The second survey focused on customers of produce box subscription programs, also commonly referred to as community supported agriculture (CSA) shares. Once again, the project team wanted to determine interest among this potential market in locally grown and processed products, specifically focusing on frozen fruit and vegetable products. A year-round CSA 'share' program including frozen processed products could be a strategy for farmers to boost subscriptions, add value to their shares, and increase sales. Indeed, this approach has been used successfully in other programs nationwide, including at the Farm Bridge processing facility in New York (see Farm Bridge).

The survey was sent to the CSA membership of three farms located in Thurston County. The survey was distributed to the CSA customer lists in early October, and reached a total of approximately 600 CSA subscribers across the three farms. While the original plan was to send out the survey in the summer, the project team decided to distribute the survey later in the season so first-time CSA subscribers could experience an entire season with their share before providing feedback.

The survey distribution process took place in stages and was facilitated by the farm owners to ensure confidentiality of the membership. An initial email was first sent that introduced the project, and indicating a link to a survey would be forthcoming. Approximately one week later, a second email was sent that contained an anonymous url link along with supplemental information about the project. Following this, a reminder email was sent a week later to encouraging recipients to complete the survey if they hadn't already. And finally, a 'last chance' email was sent another week later, following which the survey was closed at the close of a final week.

The survey was designed using Qualtrics Software (Qualtrics 2018), and consisted of twenty-two questions. These combined questions from the farmers market customer and institutional buyer surveys. Survey questions are available in Appendix B.

The survey contained both types of willingness to pay questions included in the other surveys, the premium question and the Van Westendorp question set. In this survey, the premium question focused on a CSA share that included locally grown and processed products. Additionally, in order to simplify and streamline the survey for the respondent and the evaluator, the Van Westendorp set allowed respondents to choose from a range of prices instead of asking them to fill in their own prices (as was done during institutional buyer interviews). The survey also included additional demographic questions (race/ethnicity and household size) that would allow the project team to compare results with other markets (such as grocery store customers) in the future.

Van Westendorp Analysis

Van Westendorp analysis was implemented by asking respondents to identify the following four price points for a product of interest:

- The price at which a product is priced too low, to the extent that it's quality might be questioned
- The price at which the product is a great bargain
- The highest fair price for a product, the price at which the product is starting to get too expensive
- The price that is too high for the product, to the extent to which you would not purchase it.

Each respondent thus provided a set of prices. In aggregate, subscriber responses were plotted as curves of either increasing or decreasing populations as a percent of the total. The percent of total identifying the price at which a product is too cheap will increase as the price decreases. Alternately, the percent of total identifying the price at which a product is a great bargain will decrease as the price increases. Similar relationships exists for the latter two price categories: the percent identifying the highest price they will pay will decrease as the price increases, and the population will alternately increase as the price at which a product is too expensive to purchase is decreased.

The former two, and latter two relationships, when plotted as line graphs, demarcate an area of potentially optimum pricing between the point where the former two and the latter two lines cross.

Survey Results and Discussion

One of the primary objectives of this part of the market assessment was to evaluate the interest in (and market for) year-round sales of value-added products, in particular frozen fruits and vegetables.

In total, 254 subscribers responded to the survey, comprising a 42 percent response rate. The number of responses was not precisely consistent across all questions as some questions allowed respondents to select multiple fields, and respondents occasionally skipped questions.

CSA subscribers believed it is important that locally processed foods use locally grown ingredients. As at the farmers' market, customers/subscribers were interested in purchasing locally grown and processed foods, including frozen products. CSA subscribers were overall willing to pay more for a locally grown and processed product, which aligned with their values. Subscribers did exhibit more limited willingness to pay than farmers' market respondents, potentially due to the higher baseline cost of a CSA share.

Respondents to the survey were largely white (88%). Forty-five percent of respondents live in two person households. The bulk of respondents were fairly evenly distributed between 30 and 60 years old, with only 6% between the ages of 21 and 29. Twenty-nine percent were in their first year of their CSA subscription, while 71% had been subscribers for at least two years. Some respondents that selected "Other" wrote they had been subscribers for over 10 years. When asked if they would continue with their CSA membership, 79% of respondents said they definitely or probably would (53% definitely, 26% probably). This demographic information wasn't particularly surprising, but created a useful base for future market research (for comparison with other CSA subscribers, and with other potential customer bases such as at retail outlets).

Regarding current purchase practices and interest in locally grown and processed frozen fruits or vegetables (Figure 3), 36% of respondents indicated they purchase frozen fruits or vegetables, but that they are not locally grown or processed. The most purchased local product was pickled or fermented vegetables (40%), and jams and jellies (31%).

Figure 3. Which processed fruit and vegetable products respondents purchase.

One of the area of interest for the research team was whether CSA subscribers purchasing frozen fruits and vegetables would be interested in a local version. When asked, 75% said they would be either very interested or interested (48% very interested, 25% interested) in a winter CSA share that included locally grown and processed fruit or vegetable products. When asked about specific frozen products, there was no standout winner. Responses were fairly evenly distributed across the options given. It appears that there may be an opportunity for locally grown and processed frozen fruit and vegetable products to supplement or replace the non-local products CSA subscribers are buying.

Regarding motivation for buying local goods, CSA-subscriber responses were similar to those of farmers' market customers. Thirty-four percent of respondents selected freshness/quality as their main reason (Figure 4). Interestingly, the third most selected reason for purchasing local foods (23%) was to know where/how product was grown. Finally, in contrast to the market customers, only 36% of respondents indicated that the main reason they bought local foods was to support the local food system (27% support local farmers, 9% support local economy), while no one chose price as the reason they buy local foods. The responses indicate that CSA subscribers care about knowing where their food comes from, and are willing to pay more for fresh produce from a local farmer. Similar to the farmers' market survey, these initial responses indicate that distributing locally grown and processed products through CSAs would be of interest and likely profitable (depending on processing costs).

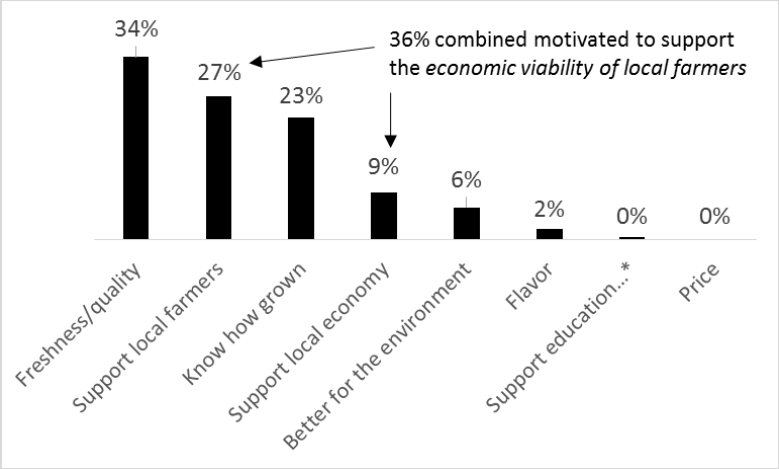

Figure 4. Respondents' primary reason for buying local foods.

Determining customer values was important to evaluating the interest in locally grown and processed goods, and the potential for origin-identified labeling. Customers were asked how important it was to them that locally processed foods use locally grown ingredients, and how important it was to them that locally grown and processed foods have a label that identifies the location and farm they came from.

The project team hypothesized that if subscribers thought it was important to use local ingredients to make locally processed products (such as a jam), then they would also think it's important that the product is labelled accordingly. This is important for the project, as one of the proposed marketing tools for products made in the proposed processing facility is an origin-identifying label. Among subscribers, 85% expressed that it was important or very important (31% important, 54% very important) to them that products processed locally used locally grown ingredients. Additionally, 82% expressed that it was important or very important (38% important, 44% very important) to them that locally grown and processed products use a label identifying its origin.

After queries regarding values, subscriber's willingness to pay was evaluated by asking them indicate how much they agreed with the following statement: "I am willing to pay more for locally grown and processed, organic, fruit or vegetable products." After reviewing the previous responses, it was not surprising that 97% of respondents indicated that they agreed with this statement (46% agree, 51% strongly agree).

Overall, responses indicated that subscribers highly value locally grown and processed foods, and are willing to pay more for those foods because of it. Subsequent questions prompted respondents to place a dollar amount on their values are. Subscriber willingness to pay was evaluated two ways, first by identifying from a provided list the highest they would be willing to pay for a local product in comparison to a non-local product, and second using what is called a Van Westendorp question set. The difference in the former was calculated as a percent price premium. In the latter, a potentially optimum price range was identified. Both pricing question formats were included to facilitate comparison of responses with those from the farmers' market customer survey (price premium) and institutional buyer survey (Van Westendorp).

Regarding willingness to pay as calculated as a percent price premium, subscribers were asked what was the most they would pay (per week) for a winter CSA box that included locally grown and processed products (such as a frozen stir-fry veggie mix) compared to a box that didn't include locally grown and

processed fruit or vegetable products. They were asked to assume that the latter box cost $30 per share, and that both boxes contain organic products.

Compared to 93% of farmers' market respondents, only 62% of CSA subscriber respondents were willing to pay a premium for a weekly winter CSA share that included locally grown and processed products. When breaking down the willing responses (Figure 5), 8% would pay three dollars more, 25% would pay $5.00 more, and 29% would pay $7.00 or more (7% would pay $7.00, 19% would pay $10.00, and 3% would pay $15.00 more).

Looking at the top responses in a different way, 37% were not willing to pay any premium, 25% were willing to pay a 17% premium, and 19% were willing to pay a 33% premium. While over half of respondents indicated they were willing to pay a premium, the amount they were willing to pay was smaller than the premiums observed in the farmers' market responses. One reason that may account for this is that the price of the hypothetical weekly full share CSA subscription was already fairly high. Farms running a CSA program can have several different share types and sizes, so it's possible that subscribers with a smaller share would be willing to pay a higher premium if the starting point was set lower.

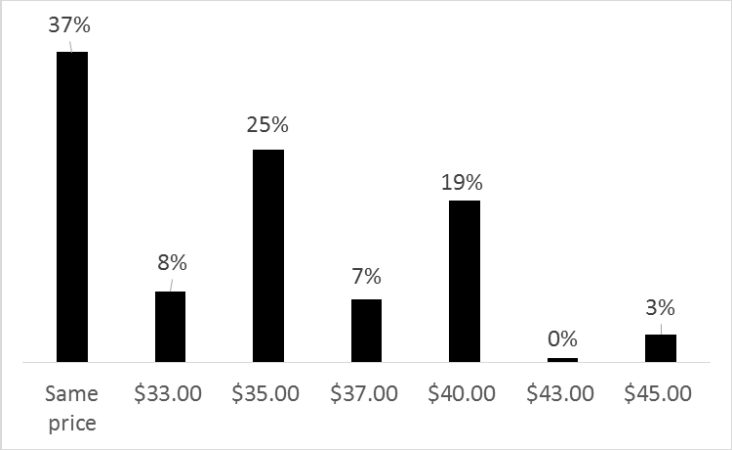

Figure 5. The most respondents would be willing to pay for a weekly winter CSA share containing organic locally grown and processed products.

Pricing analysis completed using the Van Westendorp approach provided a potentially optimum price range, on a per pound basis, for two products: stir fry veggie mix and blueberries (Figure 6). The results are comparable with the Rapid Market Assessment results, which indicated that most shoppers would pay $4.50 to $5.00 per pound for stir fry veggie mix. CSA subscribers' willingness to pay between $2.50 and $5.00 thus represents a wider range of willingness, and corresponds to potentially more conservative price points of this population.

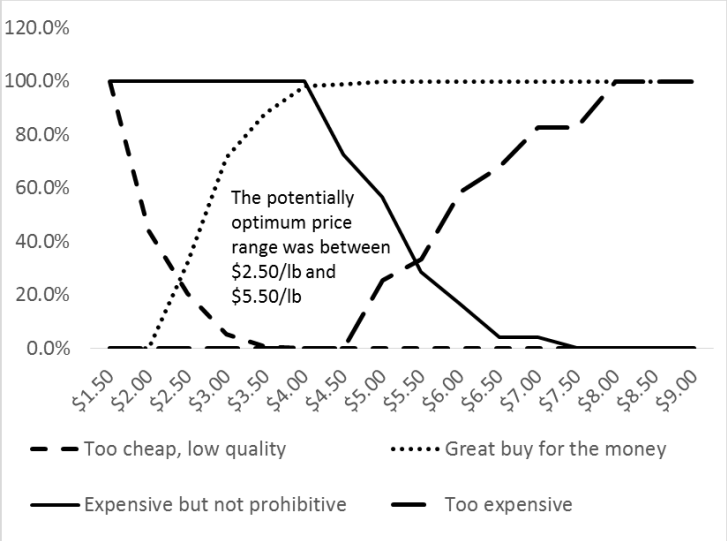

Figure 6. The potentially optimum price range of locally grown and locally processed stir fry veggie mix. Respondents were asked to assume that products were grown and processed organically.

By contrast, results from this analysis are not directly comparable with the price premium question as the product of interest is not a share but an individual product. However, the upper end of the price range that CSA subscribers were willing to pay ($5.00) represents a 40% price premium (Table 3) over the average price of three mixed vegetable products found in local retail grocery outlets (two organic, one not organic).

Table 3. Prices of frozen vegetable products available in retail outlets

Product	Price ($/lb)	Organic (Y/N)	Other label claims
Chinese Stir-Fry Mix	$4.78	Yes	Pollinator friendly
Cut Green Beans	$3.66	No	Sustainable
Corn	$2.69	No	Sustainable
Broccoli florets	$3.19	Yes	Pollinator friendly
Kale	$3.20	Yes	Pollinator friendly
Peas	$4.78	Yes	None
Potato hashbrowns	$3.99	Yes	Pollinator friendly
Roasted herbed potatoes	$3.99	No	Non-GMO
Four-vegetable mix	$3.42	Yes	Easy to prepare
Vegetable mix	$2.49	No	Good side-dish
Average	$3.62		

Institutional Buyer Survey

The final survey focused on institutional buyers in the south Puget Sound. Institutional buyers are the food service directors, executive chefs, and nutrition services directors of organizations such as school districts, prisons, and hospitals. Since institutional buyers purchase food at wholesale prices, this market has the lowest willingness to pay out of the three examined. This is both a challenge and an opportunity – if the food processing facility was able to work with a large institution, it could be an anchor client that would provide stable revenue while the facility grows.

There were approximately 45 institutional buyers receiving the survey information, compiled into a contact list. Institutions included school districts, prisons, hospitals, and senior services/living facilities located in Thurston, Pierce, Lewis, Mason, Grays Harbor, and Pacific counties. Two partners agreed to test the final survey draft before it was officially released. The first request to complete the survey was sent to the email list in late June. The survey process took place in stages and continued throughout the rest of the year.

The outreach steps were as follows. First, an email was sent to the buyers, introducing the project and asking them if they would like to participate. Institutional buyers were able to choose from four different ways to take the survey: an in-person meeting, a phone call, completing a PDF, or a Qualtrics survey. Second, roughly one to two weeks later, buyers who had not responded to the email were called. This process was repeated each month. Finally, a 'last chance' email was sent to the list in late December, at which point the survey was closed.

The survey was the longest of the three market assessments, containing 31 questions. Some of the questions included were based off of questions in surveys from two studies, *Evaluation of Options for Freezing Produce in Western Massachusetts* and *Scaling up Vermont's Local Food Production, Distribution, and Marketing*. There were 13 responses, with a response rate of 29%; however, the number of responses was not the same across all the questions because some questions allowed multiple choice responses, and some questions did not apply to all buyers.

The survey contained only one type of willingness to pay question, which was the Van Westendorp question set. In contrast to the CSA subscriber survey, the Van Westendorp questions did not offer a range of prices to choose from. Instead, each buyer was asked to fill in their own answers. Unlike most CSA subscribers, it was assumed that institutions typically have a pre-determined and limited budget for food, which means they are generally able to provide a greater level of detail about the prices they are willing to pay. Additionally, the survey contained questions asking about the price and quantity of frozen fruit and vegetable products the institutions currently purchased.

Institutional Buyer Assumptions and Hypotheses

For the final survey, the project team was focused on trying to identify prices for frozen fruit and vegetable products. More than any other market examined, institutional buyers are highly limited by their food budgets and must purchase food products that fall within that budget.

While values may help buyers make decisions when choosing products, they may not be able to *purchase their principles*, so to speak, to the same degree that farmers' market customers and CSA subscribers are. What may really matter for institutional buyers, we hypothesized, is the quality and price of a product. This line of thinking raised the following question: if buyers are interested in locally grown and processed fruits and vegetables, could these products be priced competitively? In order to determine this, the team needed to determine what institutional buyers are already paying, and what they're willing to pay. The full survey can be viewed in Appendix C.

Survey Results and Discussion

The majority of respondents worked at a school (38%) while 31% worked at a correctional facility, 15% at a hospital, 8% at a state cafeteria, and 8% at a senior services/senior living facility. Fifty-seven percent of respondents indicated that they already purchased local foods at their institutions. However, when asked what percent of their institution's total food purchases were local, 83% said those local foods only made up 0-5% of all food bought.

When asked if they are interested increasing the percentage of local foods their institution purchases, 69% said they were interested. Institutions have a large amount of potential for supporting and sustaining the local food system, one question the team evaluated was potential obstacles to increased local purchasing.

To address this interest, institutional buyers were asked both motivation for buying local products, and factors that purchasers from buying locally, respectively. Somewhat different from the other market assessments, an interview format allowed for buyers to select their top four reasons for buying locally.

Surprisingly, the most selected reason for purchasing local foods (22%) was price (Figure 7). Based on what buyers said were preventing more local food purchases, "price" was interpreted as a factor that could potentially motivate buyers to purchase more local foods. Similar to other survey respondents, 25% of respondents selected freshness or quality as their main reason (17% quality, 8% freshness). Supporting the local food system (14% support local farmers, 17% support local economy) also appeared to be a motivating factor.

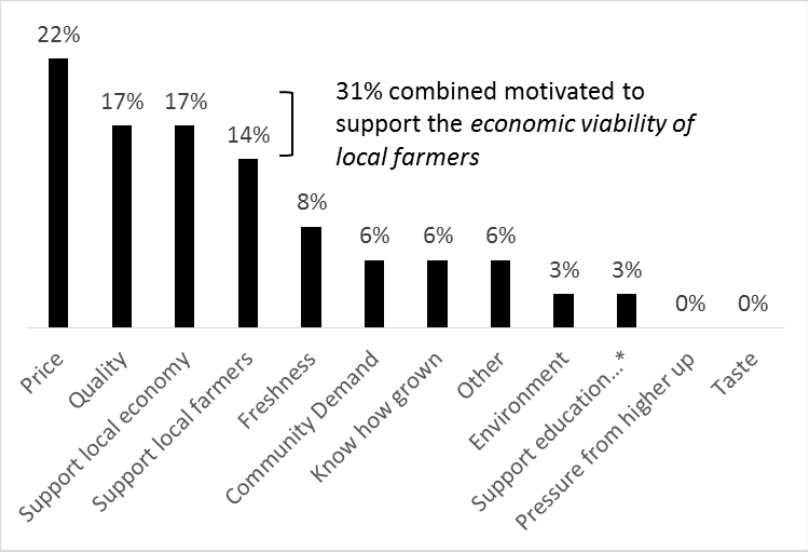

Figure 7. Motivations of respondents to buy local foods.

The two main obstacles to buying more local foods appear to be a lack of time/inability to focus on it (19%), and food budget constraints (14%; Table 4). Additionally, it seems that buyers want to purchase local foods, but encounter logistical issues get in the way (8% say products are not available in the form they need, 5% lack resources to receive deliveries from farms, 5% don't know how to purchase directly from a farm, 3% say farmers do not deliver to their institution, and 3% say a local farmer does not have enough product).

Table 4. Obstacles preventing respondents from buying local foods.

I have not been able to focus on this	19%
Food budget constraints	14%
Other	11%
Products are not available in the form I need them	8%
Labor/food prep budget constraints	8%
Food safety assurances/concerns	5%
I lack the resources to receive deliveries from multiple farms	5%
I want to purchase local foods directly from a farm, but don't know how	5%
I want to purchase local foods directly from a farm, but local farmer does not have enough product	5%
My distributor does not carry it	5%
Storage	5%
Equipment constraints	3%
I was to purchase local foods, but local farmer does not deliver to my institution	3%
Pressure from higher up	3%
My distributor does not identify or highlight local products	0%

**Other included: products not available at right time, lack contracts, no time to build relations/work with farmers*

Commitment Model Purchasing

One way the food processing facility may be able to help institutional buyers address their logistical problems is through a commitment ordering model. In this model, and institution places orders for local products in the winter, and the local aggregation cooperative fills those orders throughout the summer buy sourcing product from multiple local farmers. When asked if they would be interested in working with an entity using a commitment model, respondents were cautious. Twenty-three percent of respondents said they would be interested, while 69% said they might be. Part of the commitment model involves negotiating a price that works for both the farmers and the buyers. When asked if they would be willing to negotiate with a central aggregator for prices, 38% said they would be and 54% said they might be willing to do so.

Hesitancy to engage in a commitment model likely was due to institutions' limited budgets and inability to pass costs along to the end consumer. When asked to choose a statement that best reflected their ability to pass costs along, 60% of respondents chose "It is difficult to impossible" for them.

Frozen Vegetables and Fruit

Another question the team had was whether institutions might be a viable market for locally grown and processed frozen fruit or vegetable products? When asked if their institution currently purchases frozen fruits or vegetables, 93% of respondents said yes. Question 16 the asked respondents if they were interested in purchasing specific locally grown and processed frozen fruit or vegetable products. There was general interest among respondents with no standout winner. Responses were fairly evenly distributed across the options given. However, there was a three way tie (14%) between the vegetable medley, strawberries, and blueberries.

It was found that institutional buyers already purchase frozen fruits and vegetables, and are interested in buying local versions of those products. If the price is right, there may be an opportunity for locally grown and processed frozen fruit and vegetable products to be bought by institutions.

To determine price potential, interviewees were asked to identify the average price per pound of each of the frozen fruits or vegetables currently purchased. Respondents answered this question based on the products they purchased, so they may not have had a price for each frozen product.

When the averages for each product were calculated, vegetables were the lowest. The average price per pound of peas was $0.86, and broccoli was $1.45. The vegetable medley, more valuable because it's a mix of frozen vegetables, was priced at $1.52 per pound. Unsurprisingly, the frozen fruit was purchased at higher prices. The average price per pound of strawberries was $1.73, blueberries was $1.75, and raspberries was $2.12.

Facility Site Visits and Case Studies

Site visits were proposed and scheduled over the course of 2018. Sites included locations across Washington, as well as one in Massachusetts. Data collected during case study interviews included equipment selection and prices, processing line layouts, and organizational and business structures - including ownership models, product marketing and branding strategies, lessons learned and regulatory challenges encountered. The data collected will guide strategic suggestions and proposals for appropriate processing lines in a south Puget Sound facility.

The Washington State University Extension Food Processing program provided input on processing equipment and line research and technical consultation on case study data collection. Further market analysis, case study, and processing equipment data collection tools will be reviewed prior to implementation.

Site Visits

The project team lead began the site visits over the summer, traveling to the Western Massachusetts Food Processing Center in Greenfield, Massachusetts and LINC Foods in Spokane Valley, Washington. In the fall, members of the project team and a group of farmers, economic development personnel, and public representatives from Thurston, Lewis and Grays Harbor Counties traveled to Skagit and Whatcom Counties to visit grain, fruit, vegetable, and other farm product processing and marketing infrastructure. This trip included visits to several facilities including a shared use kitchen, malting facility, the Skagit Valley College Brewing Academy, two berry processing facilities, a farm processing kitchen, the Puget Sound Food Hub, the Washington State University Bread Lab, Cairnespring Mills, and a grain storage facility. For more information and notes about each site, read the full trip summary here: https://s3.wp.wsu.edu/uploads/sites/2056/2018/10/Skagit-Tour-2018_Notes-1.pdf.

The trips provided the project team with insights about the equipment and logistical requirements that need to be met in order to successfully run a food processing facility. Additionally, the trips provided examples of farm product marketing infrastructure that is not currently present in the south Puget Sound region. Examples of infrastructure that could enable farmers in the region to increase their marketing opportunities include facilities and equipment for storage and crop processing. The project team and tour participants believe that better farm product processing and storage infrastructure could lead to higher priced sales options for farmers. This could simply mean off-season sales of stored crops, selling processed crops such as malted barley or milled flour, or direct sales to local or regional buyers.

Site Visit Lessons Learned

After visiting the facilities and speaking with staff, the project team feels that creating a successful aggregation and distribution system is possible in south Puget Sound, especially if it connects to an existing Food Hub in northern western Washington and is able to tap into existing sales accounts and distribution logistics. Additionally, commodity agriculture has become difficult to sustain in western Washington as the region continues to develop. Specialty, niche, and value-added agriculture appear to be a promising alternative to commodity agriculture, in particular if a compelling narrative can be used to take advantage of direct sales to farm customers and accounts with restaurants, and institutions.

If value-added processing infrastructure may be critical to sustained viability of farming in western Washington, then a lack of scale-appropriate processing infrastructure is one of the central barriers keeping farmers from successfully accessing available markets. Currently, available facilities and equipment in the south Puget Sound are either for home or industrial scale businesses. There are no viable options for a mid-size farm or food business. When beginning to invest in infrastructure in the region, initial infrastructure of interest should be grain storage and processing, and fruit/vegetable aggregation and distribution operations. Both of these operations should be able to connect with other regional food aggregators/distributors in western Washington.

Conclusion

Agricultural viability in the south Puget Sound requires more than an effective production system, it needs a regional foodshed that includes research, diverse markets for all crops in a rotation, crop or livestock product storage, crop processing infrastructure, marketing infrastructure, visibility among customers, and connections from the farmer and field to the end-customer.

Considerable public (Port) investment has been made in agriculture in Skagit County, including funding for processing facilities, operational financing, shared use kitchen equipment, and reduced rates on warehouse rental space. Food system development is a public good, and it should be supported by grants and other public funding mechanisms. Public investment in the south Puget Sound is not only vital to creating an effective agricultural infrastructure, but also critical to attracting private capital investments.

Future Work

The market assessment work completed in this project is being integrated into a feasibility assessment of a value-added processing facility for vegetables and fruit. The facility would be scaled, for early cost estimations, to be able to process 1,000 pounds of raw product per day. Initial product processing would focus on individual vegetables such as squash, beans, broccoli and carrots, mixes of these vegetables, and berries. It is envisioned that a facility may best be economically viable if paired with an anchor tenant, and rental use by other food entrepreneurs. Facility location is not determined.

The feasibility assessment is integrating the above market assessment with data on equipment and facility start-up costs, and facility operations data. Funding was provided in 2018 and 2019 by the Port of Olympia.

References

Bramwell, S. G., Moorehead, S., Meade, A., Sero, R., Gray, S., & Nowlin, M. (2017) South Puget Sound Agricultural Producer Needs Assessment. Retrieved from: https://s3.wp.wsu.edu/uploads/sites/2056/2014/01/South-Sound-Agricultural-Producer-Needs-Assessment.pdf

Day-Farnsworth, L., B. McCown, M. Miller, and A. Pfieffer. 2009. Scaling Up: Meeting the Demand for Local Food. University of Wisconsin-Extension Ag Innovation Center and UW-Madison Center for Integrated Agricultural Systems, Madison, WI.

Donovan, K., & Kinney, K. (2017). Olympia Farmers Market 2017 Rapid Market Assessment Report. Retrieved from: http://www.wafarmersmarkettoolkit-org.wafarmersmarkets.org/wp-content/uploads/2017/11/Olympia-FM-RMA-Report-9-30-2017.pdf

Feenstra, G. and S. Hardesty. 2016. Values-Based Supply Chains as a Strategy for Supporting Small and Mid-Scale Producers in the United States. Agriculture 6(39).

Gwin, L., & Lev, L. (2011). Meat and Poultry Buying at Farmers Markets: A Survey of Shoppers at Three Markets in Oregon. *Journal of Extension, 49*(1). Article 1RIB4. Retrieved from: https://www.joe.org/joe/2011february/rb4.php.

Ikerd, J. 2015. The Status and Future of Local Foods. http://johnikerd.com/the-status-and-future-of-local-foods/ (Accessed 18 February 2019).

Moskin, J. 2016. When Community Supported Agriculture Is Not What It Seems. https://www.nytimes.com/2016/07/20/dining/csa-farm-share-community-supported-agriculture.html?_r=0 (Accessed 22 July 2017). The New York Times Co, New York, NY.

Nelligan, D., N. Cameron, B.L. MacKinnon, and C. Vance. 2016. Bridging gaps: A framework for developing regional food systems. Journal of Agriculture, Food Systems, and Community Development. 7(1): 49-69.

Ujcic, S. 2018. Personal communication. Rochester, WA.

USDA, 1992. Census of Agriculture. https://www.agcensus.usda.gov/Publications/ (accessed 22 July 2017). USDA-NASS, Washington D.C.

USDA, 2007. Census of Agriculture. https://www.agcensus.usda.gov/Publications/ (accessed 22 July 2017). USDA-NASS, Washington D.C.

USDA, 2012. Census of Agriculture. https://www.agcensus.usda.gov/Publications/ (accessed 22 July 2017). USDA-NASS, Washington D.C.

Vogel, S. and S. Low.2015. The Size and Scope of Locally Marketed Food Production. https://www.ers.usda.gov/amber-waves/2015/januaryfebruary/the-size-and-scope-of-locally-marketed-food-production/ (Accessed 18 February 2019). USDA ERS, Washington D.C.