



***Current and Potential Economic
Impacts of Locally-Grown Produce
in Southeast Alaska***

Prepared for:
**Spruce Root, Inc.
Sustainable Southeast Partnership**

February 2017



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Executive Summary

Spruce Root, Inc. and Sustainable Southeast Partnership contracted with McDowell Group to estimate the total amount of produce grown in the region, as well as the associated economic impacts. Commercial production was estimated via interviews with growers. Household production was estimated via a telephone survey of 205 randomly-selected Southeast Alaska households that grew food (maximum margin of error of ± 7 percent).

Impressive Levels of Household Production in the Region

Southeast Alaska's local food system includes an impressive amount of gardening and home production of fruits and vegetables. Survey results indicate roughly 38 percent of Southeast Alaska's households – or 11,400 total households – grew food in 2016, slightly higher than national rates.

On average, households that grew food produced about 24 percent of their household's total summer vegetable needs and almost three-quarters (71 percent) of households said they would like to grow even more food than they did. Respondents indicated an average of 14 years of experience growing food in Southeast Alaska.

Commercial Production Currently at a Small Scale

Roughly 30 commercial growers in Southeast Alaska contributed to a combined estimated total of \$180,000 in fruit and vegetable sales in 2016. Interviews indicate that nearly all commercial growing operations in the region evolved from gardens started for household consumption and retain a dual function. While currently at a small scale, commercial growing in Southeast Alaska has experienced increased attention in recent years, and demand appears to be much higher than supply. High rates of growth of the industry are possible, especially if innovative business models and technologies are applied.

The table below addresses household and commercial growing and provides estimates for total production, sales, and expenditures related to growing fruits and vegetables in Southeast Alaska in 2016.

Table ES-1. Estimated Production, Sales, and Expenses for Household and Commercial Fruit and Vegetable Growing in Southeast Alaska, 2016

	Household	Commercial	Total
Fruit and Vegetable Production	800,000 pounds	30,000 pounds	830,000 pounds
Estimated Total Sales	-	\$180,000	\$180,000
Estimated Total Expenditures to Support Growing	\$1,690,000	\$100,000	\$1,790,000

Most Fresh Vegetables Consumed in Southeast Alaska Are Imported

Based on per capita USDA estimates and Southeast Alaska's 2015 population, it is estimated that a total of 12.6 million pounds of fresh vegetables are consumed every year in the region. Of these, an estimated 4.4 percent are grown locally and 95.6% are imported. Retail sales of imported fresh vegetables are estimated at roughly \$19 million in 2016.

Commercial Growing Accounts for Nearly All Measurable Economic Impacts

The economic impacts associated with increased household production are minimal, largely limited to those resulting from shifting purchases from imported food to a mix of imported and locally-produced supplies needed to grow food. Households also benefit from a supply of healthy food and a modest savings in total spending, but these benefits are not quantified in this study and not generally considered in economic impact studies.

Commercial production directly adds value to the region's economy, and stimulates additional spending by businesses and households in the region. However, these economic impacts in Southeast Alaska are limited, totaling \$250,000 to \$300,000 (including multiplier effects) in 2016 and up to \$1.4 million annually under a scenario of very aggressive growth in the industry.

Economic Impacts Don't Fully Capture the Value of Locally-Grown Food

High rates of home gardening results in a wide variety of health and other benefits for an impressive number of households in the region. In addition, roughly 15 percent of the food grown by households is shared with others, building social connections and spreading these benefits more widely. Because Southeast Alaska's communities are geographically isolated and vulnerable to shipping disruptions, local food production also contributes to food security in the region.

There is also evidence for increased levels of entrepreneurship resulting from a more developed local food system. Even if local food businesses aren't successful or pursued, such efforts can be a stepping stone to the generation of other businesses.

Options Exists to Increase the Economic Impacts of Local Production

A focus on increasing commercial growing and sales will have the largest impact on the economy. Efforts that bring new money into the economy, such as by stimulating additional sales from the region's vibrant visitor industry, are especially promising from an economic development perspective.

The large number of household growers provides a base of expertise on which to expand local food production. Many of these households may already be producing more food than they consume, and can be encouraged to start selling or sell more of their produce. Household growers are less sensitive to the industry's main challenges – affordable labor and land – compared to larger-scale operations and operations that purchase or lease land specifically for food production.

Increased economic development attention has been placed on Southeast Alaska's local food system in recent years. The proposed food hub, growing number of farmers' markets, and other marketing efforts, are likely to increase sales and stimulate additional commercial production.

Lastly, growers in Southeast Alaska spend an estimated \$1.8 million each year on food growing expenses. These include purchases of soil, soil amendments, lumber, hardware, growing supplies, seeds, pots, and other goods and services. Efforts to increase the local production and sales of these inputs have immediate potential to increase the economic impact of the local food system.

Introduction and Methodology

Spruce Root, Inc. and Sustainable Southeast Partnership contracted with McDowell Group to detail the economic impacts associated with production of fruits and vegetables in Southeast Alaska. This is the first study to address this topic, including the first to estimate the total amount of produce grown in the region.

The scope of this study includes fruit and vegetables that are tended or grown, not including wild-harvested plants. To focus the study, ten commonly-grown crops were chosen for particularly detailed analysis, including potatoes, carrots, herbs, lettuces, rhubarb, garlic, cabbage, beets, kale, and zucchini/summer squash.

An addendum to this report provides information related to wild blueberry harvests, a related subject of interest to the Sustainable Southeast Partnership, Spruce Root, Inc., and residents throughout the region.

Methodology

Limited data is available related to the production or consumption of fruits and vegetables in Southeast Alaska. To partially address this gap, this study included a random sample telephone survey of households in Southeast Alaska, as well as targeted interviews with commercial growers in the region. In addition, several national and state datasets and various reports provided useful information. Key sources of information are described in more detail below.

Southeast Alaska Household Survey

A household telephone survey was fielded September 23rd through October 2nd 2016 by McDowell Group. Both cell phone and landlines were included in the survey, with a total cell phone sample of 43 percent.

The survey focused on activities in 2016 and addressed various topics, including type and amount of crops grown, spending to support growing, sharing and household use of food produced, barriers encountered, and information on the household's growing experience and demographics, among other questions.

A total of 205 randomly-selected Southeast Alaska households that grew food in 2016 were surveyed. Survey results have a maximum margin of error of ± 7 percent.¹ Responses were weighted by community to address oversampling in smaller towns in the region.² The smallest towns in the region (those with fewer than 100 estimated households in 2015) were not surveyed.

Survey responses were analyzed for the sample as a whole (topline) as well as for subgroups of the sample. Notable differences between subgroups presented are limited to those that are significant at the 90 percent

¹ The maximum margin of error applies for questions with survey results at 50 percent. The margin of error decreases as survey results approach 0 percent and 100 percent.

² Responses were weighted based on the estimated number of households in each community. Number of households per community was estimated by dividing July 2016 population estimates from the Alaska Department of Labor and Workforce Development by community-specific average household size data from the 2010 Census.

confidence level (using t-tests for means and z-tests for percentages). Full topline results from the survey are included as Appendix A. The survey instrument is included as Appendix B.

A total of 667 households were contacted, though 462 of these households did not grow food in 2016 and were not surveyed further. After weighting, it is estimated that 38 percent (± 4 percent margin of error) of Southeast Alaska households grew some amount of food in 2016.

Commercial Grower Interviews

A list of potential commercial growers in Southeast Alaska was developed based on the Alaska Department of Natural Resource's Alaska Grown Source Book, as well as the personal and professional networks of the project team. While efforts were made to include growers throughout the region, the list was most complete for growers in central and northern Southeast Alaska.

A total of 43 potential commercial growers were identified. Based on various sources of information, it was determined that at least 12 of these growers did not sell any produce in 2016. A total of 20 commercial growers were contacted and asked a series of questions relating to the quantities of various crops sold, total sales and total expenses in 2016, the size and nature of their operation, and other questions. Eleven growers on our list were not reachable or otherwise not interviewed in time for inclusion in this report. Growers were also asked for their opinions regarding the efforts most likely to increase the consumption and production of local food in Southeast Alaska. Roughly half of the commercial grower interviews were conducted over the phone, with the remainder in person or by email, depending on the availability and preference of the grower.

The protocol used for these interviews is included as Appendix C.

Juneau Area Produce Prices

A survey of four Juneau-area grocery stores (Superbear, Fred Meyer, Foodland, and Rainbow Foods) was conducted in August and September 2016. Prices for various types of fresh fruits and vegetables were collected and used to create reference prices. Standard and organic prices were collected, with outliers removed as necessary. Prices were also compared to those for Alaska published by the USDA Agricultural Marketing Service's Market Weekly Reports. The USDA price data was useful to check for changes over time, but less reliable than visiting local grocery stores for actual prices.

To estimate prices charged by growers in Southeast Alaska, prices were also collected from farmer's markets in Juneau, Haines, and Gustavus, as well from interviews with growers.

Secondary Data Sources

A variety of state and federal data sources were consulted to inform this study. Key sources included the USDA's food expenditure data, Consumer Expenditure Survey data from the Bureau of Labor Statistics, and the 2016 National Gardening Survey conducted by Harris Interactive for GardenResearch.com, among other data sources.

Limitations of the Analysis

The analysis presented in the study is subject to a variety of limitations due to a lack of relevant data and the methods used in the household survey and commercial grower interviews.

HOUSEHOLD SURVEY

The household survey is subject to sampling and non-sampling errors. Sampling errors are inherent to the survey process and a factor of the sample size. As described previously, a total of 205 randomly-selected Southeast Alaska households were surveyed, resulting in a maximum margin of error of ± 7 percent.

Non-sampling errors in the survey process are much harder to estimate, and are minimized through best-practices in survey design and administration. This study assumes that food growing is a household activity that can be accurately estimated by the person most responsible for growing food in the household. In addition, this survey asks respondents to recall and estimate information that may not be tracked by the household, such as the quantity of a certain crop grown. The project team believes non-sampling errors to have been minimized. The survey instrument is provided in Appendix B to facilitate independent evaluation of potential sources of non-sampling error arising from survey design. Additional information, including information on survey administration, is available on request to McDowell Group.

COMMERCIAL GROWER INTERVIEWS

As noted, 20 Southeast Alaska growers were contacted out of an estimated 30 with substantial sales (more than \$1,000) of local produce in 2016. The findings from these interviews are summarized qualitatively in this study. A quantitative analysis would require a larger sample size and a random sampling or census approach. Availability and openness of the growers interviewed also varied and was a factor in this consideration.

SECONDARY DATA SOURCES AND DATA GAPS

Secondary data sources are referenced throughout this report and readers are referred to websites and reports for additional information, including descriptions of the limitations of each source. Where possible, two or more data sources were compared to verify key findings.

Where no or limited data were available, the project team collected additional data from area grocery stores (pricing data as well as average weight per unit for various types of produce, for example) or used their professional and personal expertise to estimate conversion factors and other data points. In these cases, a sensitivity analysis was performed to check for the influence of the assumptions on overall findings (these were found to be minimal in all cases).

Fruit and Vegetable Production in Southeast Alaska

Fruit and vegetable production in Southeast Alaska is largely driven by the efforts of households across the region, with limited growing specifically for commercial sales. Nearly all commercial operations in Southeast Alaska evolved from gardens started for household consumption and retain a dual function.

This study provides the first comprehensive overview of fruit and vegetable gardening in Southeast Alaska, including an estimate of the total volume of fruits and vegetables produced in Southeast Alaska in 2016. Results are based on data from a household survey, combined with interviews with commercial growers in the region.

Household Production

Selected results from a survey of 205 Southeast Alaska households that grew at least some food in 2016 are presented below. Survey responses were analyzed for the sample as a whole (topline) as well as for subgroups of the sample. Notable differences between subgroups are presented below, limited to those that are significant at the 90 percent confidence level. Full topline results are presented in Appendix A.

GROWING RATE AND LOCATION

Survey results indicate roughly 38 percent of Southeast Alaska's households grew food in 2016, slightly higher than national rates.³

The most common location for growing food was in the yard (84 percent), followed by inside the house in pots (33 percent), and in a greenhouse (32 percent). Relatively few households (4 percent) reported growing at a community garden.

Households more likely to grow food in specific locations include:

- Households outside of Juneau were more likely to grow food in pots inside their house, compared to households in Juneau (41 percent compared to 21 percent).
- Households where the respondent interviewed was 18-35 years of age were more likely to grow food in a greenhouse (55 percent compared to 24 to 35 percent for households with older respondents).
- Households that reported growing over 50 percent of their household's summer vegetable needs were more likely to grow food inside their house in pots (49 percent compared to 28 to 32 percent for other households), in a greenhouse (51 percent versus 15 to 41 percent for other households), and at a community garden (14 percent compared to 1 percent for other households).

³ (Butterfield, 2016) estimated that 36 percent of U.S. households participated in food gardening in 2015. (Pew Research Center, October 2016) found that roughly 33 percent of U.S. adults say they have a vegetable garden at home.

CROPS GROWN

Of households that grew food, the most common types of crops grown were fruits (78 percent), herbs (70 percent), and root crops (66 percent). More than half of gardening households grew warm weather crops such as squash and tomatoes (57 percent) as well as lettuces and other greens (52 percent). Fewer household reported growing other vegetables such as cabbage or peas (44 percent) or bulb vegetables such as onions or garlic (38 percent).

Households more likely to grow certain types of crops include:

- Households in predominantly Alaska Native villages were more likely to grow fruits (87 percent versus 77 percent for other households) but less likely to grow herbs (57 percent versus 71 percent).
- Households where the respondent interviewed was 18-35 years of age were more likely to grow root crops (88 percent compared to 54 to 69 percent for households with older respondents), other vegetables such as cabbage and peas (68 percent versus 34 to 50 percent), and bulb vegetables such as onion or garlic (72 percent versus 27 to 45 percent for households with older respondents).
- Households that reported growing over 10 percent of their household’s summer vegetable needs were more likely to grow all types of crops. The difference was particularly large for bulb vegetables (78 to 95 percent of these households compared to 41 percent of other households), warm weather crops such as squash and tomatoes (70 to 75 percent compared to 33 percent), and lettuces and other greens (61 to 85 percent compared to 29 percent).

Survey respondents were also asked about which specific crops they grew. Table 1 below lists all crops grown by more than 1 percent of gardening households in Southeast Alaska.

Table 1. Crops Grown by More Than One Percent of Southeast Alaska’s Gardening Households, 2016

Crop	Percent Growing	Crop	Percent Growing	Crop	Percent Growing
Rhubarb	57%	Parsley	24%	Broccoli	11%
Potatoes	51%	Rosemary	23%	Dill	10%
Carrots	46%	Cilantro	22%	Cherries	10%
Raspberries	41%	Beets	19%	Arugula	6%
Tomatoes	39%	Oregano	18%	Cauliflower	6%
Lettuce	39%	Sage	17%	Gooseberries	5%
Basil	37%	Spinach	15%	Turnips/Rtbgs	5%
Chives	36%	Cabbage	15%	Leeks	4%
Peas	35%	Apples	14%	Parsnips	4%
Zucchini/summer squash	34%	Green beans	13%	Mustard greens	3%
Strawberries	30%	Peppers	13%	Shallots	3%
Mint	28%	Chard	12%	Fennel	2%
Onions	28%	Currants	11%	Brussel sprouts	2%
Kale	28%	Radish	11%	Kohlrabi	2%
Thyme	28%	Cucumbers	11%	Asian greens	1%
Garlic	24%				

AMOUNT GROWN

For ten crops, detailed information on the amount grown or harvested was collected. A variety of questions were used to facilitate estimation and recall by survey respondents. Data for certain crops was collected by volume (herbs and lettuces, for example), whereas others were collected by pound (carrots and potatoes, for example) or number of plants grown (rhubarb and squash, for example). Where necessary, responses were converted to estimates of total pounds harvested.⁴

Table 2. Estimated Pounds of Selected Crops Grown by Southeast Alaska Households, 2016

Crop	Percentage of Southeast Households that Grew Crop	Average Pounds Harvested per Household that Grew Crop	Estimated Pounds Harvested by Southeast Households
Potato	19	24.2	137,400
Rhubarb	22	18.3	117,850
Carrots	18	16.0	80,125
Squash	13	8.6	32,000
Cabbage	6	19.2	30,050
Kale	11	8.4	25,300
Beets	7	12.1	24,200
Herbs	27	2.9	23,175
Lettuces	15	5.3	22,150
Garlic	9	7.6	18,625

Note: Production estimates do not include household production that was sold for money.

SHARING AND SALES

On average households surveyed consumed roughly 85 percent of what they grew. The remainder was shared (15 percent) or sold (0.4 percent).

Households more likely to share food included those where the respondent surveyed was younger (households with respondents aged 18-35 shared an average of 32 percent of what they harvested compared to 10-17 percent for older respondents) or Alaska Native/American Indian (21 percent of production by households with Native respondents was shared versus 7-15 percent for other households).

SHARE OF TOTAL VEGETABLES CONSUMED

On average, households surveyed estimated they grew about 24 percent of their household's total summer vegetable consumption. This portion increased to 37 percent for households with over 21 years of experience growing in Southeast Alaska (compared to 17-24 percent for households with less experience).

⁴ Average weights were determined from data collected at Juneau grocery stores and farmer's markets. Average production per plant and estimates of field loss were informed by survey results as well as other data sources.

SPENDING AND SAVINGS

On average, households that grew food spent \$148 in 2016 on tools, seeds, soil amendments, and all other gardening expenses.⁵ Extrapolating to the 11,400 households estimated to grow food in Southeast Alaska, a total of \$1.69 million was spent by Southeast Alaska households to support growing food in 2016.

Households that reported spending more in 2016 than in recent years were more likely to also report growing more food than in recent years (77 percent compared to 33 to 35 percent for households that reported spending less or about the same as in recent years).

Households generally agreed with the statement “As a result of growing your own food, your household spends less money on food overall” (68 percent agreed). Agreement increased with the amount of the household’s summer vegetable consumption that was grown by the household. Whereas households that produced less than 10 percent of their summer’s vegetables were as likely to agree as disagree with the statement (48 percent agree and 50 percent disagree), over two thirds (68 percent) of households that grew 10-50 percent and nearly all (87 percent) households that grew over 50 percent of their summer’s vegetables agreed with the statement.

BARRIERS AND OTHER GROWING DETAILS

Almost three-quarters (71 percent) of households surveyed indicated that they would like to have grown more food in 2016 than they did. The most common barrier reported by these households was a lack of time (48 percent), followed by a lack of garden space (31 percent), weather issues (11 percent), and other barriers.⁶

Three-quarters of households surveyed indicated they grew food organically in 2016.

Respondents indicated an average of 14 years of experience growing food in Southeast Alaska. Households with children had a little more than half as much experience, on average, as households without children (9 years compared 16 years).

Commercial Production

Twenty Southeast Alaska growers with significant sales in 2016 were contacted for this study. It is estimated these growers represent roughly two-thirds of all Southeast Alaska growers that sold significant quantities of produce in 2016.

Interviews indicate that nearly all commercial growing operations in the region evolved from gardens started for household consumption and retain a dual function. Among the operations interviewed, Farragut Farm appears to be markedly larger, with significantly higher sales and a broader marketing strategy. Based on these interviews, estimates for production, sales, and expenses resulting from all commercial growing in Southeast Alaska are presented in Table 3 below.

⁵ This estimate is a third higher than the \$111 nationwide average reported by the 2016 National Gardening Survey (Butterfield, 2016).

⁶ Other barriers reported by less than 10 percent of these households included pests (7 percent), money (7 percent), knowledge/skills (6 percent), and physical ability (6 percent).

Table 3. Estimated Production and Sales from Commercial Growing Operations in Southeast Alaska, 2016

Crop	Estimated Total Pounds	Reference Price per Pound	Estimated Total Sales
Potatoes	3,300	\$4.38	\$14,500
Carrots	3,700	\$3.50	\$13,000
Beets	1,800	\$5.58	\$10,250
Rhubarb	2,100	\$2.00	\$4,220
Garlic	2,200	\$13.11	\$28,360
Herbs	250	\$5.23	\$1,250
Squash	900	\$5.23	\$4,675
Lettuces	1,550	\$12.25	\$18,975
Cabbage	1,800	\$3.66	\$6,600
Kale	1,400	\$9.19	\$12,575
Total of Above Crops	19,000	\$6.02 (wtd. average)	\$114,450
All Other Crops (see note)	11,000*	\$6.02*	\$65,550*
All Fruits and Vegetables	30,000*		\$180,000

Notes: Values without an asterisk were estimated based on communication with commercial growers (a multiplier of 1.25 was applied to account for growers not interviewed). * Production for other crops (excluding the ten studied in detail) were estimated by dividing total estimated sales of other crops by the weighted average price of the ten crops studied in detail.

PRODUCTION

An estimated 30,000 pounds of locally-produced fruits and vegetables were sold in Southeast Alaska in 2016.⁷ Of the ten crops studied in detail, potatoes and carrots represented the top crops by pounds grown, whereas garlic and lettuces were the most important by estimated total sales.

Notable crops not studied in detail but mentioned as important by commercial growers include peas, cucumbers, tomatoes, and chard. A large number of other crops were grown and sold in 2016. These include, but are not limited to bok choy, turnips, celery, radishes, turnips, kohlrabi, apples, cherries, plums, raspberries, and currants.

Most commercial growers interviewed grew on small plots of land, averaging about a quarter to a third of an acre with the largest farm on about 1 acre. Nearly all growers used at least some low and/or high tunnels or greenhouses to increase production and enable cultivation of warm weather crops. Many of the high tunnels were reported as recent additions, with a few planning additional high tunnels but most reporting no major planned upgrades in the near future.

SALES AND EXPENSES

Based on interviews conducted, sales of locally grown fruits and vegetables in Southeast Alaska totaled an estimated \$180,000 in 2016.

⁷ Production for all other crops (excluding the ten studied in detail) were estimated by dividing the total estimated sales from other crops by the weighted average price of the ten crops studied in detail.

Estimated expenses totaled \$100,000, or 55 percent of total sales in 2016. Key categories of expenses mentioned by commercial growers included labor, soil amendments, tools and hardware, seeds, and various other expenses. On average, growers reported spending most of these expenditures with Southeast Alaska businesses. Out-of-state expenditures likely reflect mail-order seeds and supplies, as well as soil amendments, greenhouse supplies, and large purchases such as high tunnels shipped by barge or otherwise.

Estimated profits at Southeast Alaska's commercial growing operations totaled \$80,000 in 2016.⁸ Growers indicated that sales were essential to sustaining their current operations, but that other motivations also played a key role in their decision making. The most common non-monetary motivation mentioned was the satisfaction of growing high quality, nutritional food for themselves and their neighbors. Several also mentioned the importance of working outside and reducing their community's carbon footprint.

DEVELOPMENT OF THE INDUSTRY

A mixture of optimism and pessimism was obvious in discussions with commercial growers. Most growers work hard with minimal financial reward and point to serious limitations around affordable labor and agricultural land in Southeast Alaska. They would like to see increased commercial production but few are currently planning expansions, and some are considering downsizing their operations.

At the same time, there is a palpable sense of excitement about the quality of the food they grow and the satisfaction of providing it for their neighbors. The challenge of figuring out how to grow various crops more efficiently and profitably was an additional motivation for many to keep going.

A few growers noted that their operations were basically household/subsistence gardens on a larger scale. As such, they are labor intensive with a large number of crops grown and a minimal investment in mechanization. Specializing in the most profitable crops, and investing in commercial growing equipment and supplies, was noted as a potential path to increased profitability.

Growers were asked about the economic development efforts most likely to increase the consumption and production of local food in Southeast Alaska. Marketing assistance – such as help with pricing, an online marketplace, additional farmer's markets, the return of the farm-to-schools program, and public education around local food buying options – was mentioned by many growers. In addition, several growers thought more could be done to ensure the land most suited for growing food was available for that purpose, such as through local property tax exemptions for agricultural land and buildings. Lastly, improvements to the region's transportation network would be very helpful, especially the ferry system. Specifically, ferry policies could be changed to allow small shipments of unattended freight.

⁸ Averaged across the estimated 30 commercial growers in Southeast Alaska, these profits amount to \$2,667 per grower. Per capita income in Alaska is estimated at \$33,413 in the latest year for which data are available (2015 American Community Survey).

Total Production in Southeast Alaska

Table 4 below provides combined (household and commercial) estimates for total production, sales, and expenditures related to growing fruits and vegetables in Southeast Alaska in 2016.

Table 4. Estimated Production, Sales, and Expenses from Household and Commercial Growing in Southeast Alaska, 2016

Crop	Production for Household Use (Pounds)	Production for Sale (Pounds)	Estimated Total Production
Potatoes	137,400	3,300	140,700
Carrots	80,125	3,700	83,825
Beets	24,200	1,800	26,000
Rhubarb	117,850	2,100	119,950
Garlic	18,625	2,200	20,825
Herbs	23,175	250	23,425
Squash	32,000	900	32,900
Lettuces	22,150	1,550	23,700
Cabbage	30,050	1,800	31,850
Kale	25,300	1,400	26,700
All Fruits and Vegetables	800,000	30,000	830,000
Total Sales	-	\$180,000	\$180,000
Total Expenditures	\$1,690,000	\$100,000	\$1,790,000

Fruit and Vegetable Consumption in Southeast Alaska

Estimated Consumption and Expenditures

USDA’s Economic Research Service (ERS) produces annual estimates of total food availability for selected food commodities. These estimates reflect the best available data on how much of each type of food is used per capita each year. As described by the agency,

ERS calculates the residual of a commodity’s total annual available supply after subtracting measurable uses, such as farm inputs (feed and seed), exports, ending stocks, and industrial uses. The annual data series includes per capita food availability estimates, which are useful for studying food consumption trends because they are a proxy for actual food intake.⁹

The ERS also estimates how much of each food commodity ends up as waste in various steps from the field to consumption. Data presented below account for only those wastes occurring before the retail level.

Estimates for Southeast Alaska are derived from per capita USDA estimates and Southeast Alaska’s 2015 population (74,395).¹⁰ Adjustments were made to account for increased consumption of certain foods in Southeast Alaska, including kale (project team estimates Southeast Alaskans consume roughly 1.75 times the national average) and fresh carrots (1.25 times the national average).¹¹

Table 5. Estimated Consumption, Local Production, and Import Volume for Selected Vegetables and All Fresh Vegetables, Southeast Alaska, 2016 (in pounds)

Fresh Vegetable	Per Capita Consumption	Estimated Total Consumption	Estimated Local Production	Percentage Locally Grown	Estimated Import Volume
Potatoes	32.2	2,395,000	140,700	6	2,254,300
Carrots	10.3	764,000	83,825	11	680,175
Beets	0.6	42,000	26,000	62	16,000
Garlic	1.6	116,500	20,825	18	95,675
Herbs	6.0	446,000	23,425	5	422,575
Squash	4.1	307,250	32,900	11	274,350
Lettuces	24.9	1,855,750	23,700	1	1,832,050
Cabbage	6.2	462,000	31,850	7	430,150
Kale	0.8	59,000	26,700	45	32,300
All Fresh Vegetables	171	12,634,000	550,000	9	12,084,000
Rhubarb	1.7	126,500	119,950	95	6,550

Sources: USDA ERS Food Availability data, McDowell Group estimates for rhubarb and herb consumption.

⁹ The most recent available estimates are for 2014. For more information on this data source, see <https://www.ers.usda.gov/data-products/food-availability-per-capita-data-system/food-availability-documentation/>.

¹⁰ Population estimate from Alaska Department of Labor and Workforce Development. <http://live.laborstats.alaska.gov/pop/index.cfm>

¹¹ Adjustments for these crops were made based on the assumption that especially large amounts of locally grown kale and carrots compared to average consumption result in increased consumption in the region.

Import volumes were estimated by subtracting local production from estimated consumption for selected crops and for all fresh vegetables combined. The data presented above indicate that a total of 12.1 million pounds of fresh vegetables are imported every year. As shown in Table 6 below, these total imports can be converted into total estimated sales, by subtracting for loss at the retail level and then multiplying by a reference price obtained from Juneau-area grocery stores. Reference price is for common quality vegetables, and an average price for all fresh vegetables was conservatively put at \$1.75 per pound.

Table 6. Estimated Import Volume and Total Retail Sales of Imports for Selected Fresh Vegetables, Southeast Alaska, 2016

Fresh Vegetable	Estimated Import Volume (Pounds)	Percentage Waste at Retail Level	Reference Price per Pound	Estimated Sales of Imported Fresh Vegetables
Potatoes	2,254,300	6	\$1.50	\$3,178,500
Carrots	680,175	5	\$1.50	\$969,250
Beets	16,000	5	\$2.39	\$36,300
Garlic	95,675	7	\$4.99	\$444,000
Herbs	422,575	11	\$1.99	\$748,500
Squash	274,350	12	\$1.79	\$432,000
Lettuces	1,832,050	11	\$2.29	\$3,734,000
Cabbage	430,150	14	\$1.29	\$477,000
Kale	32,300	39	\$2.50	\$49,000
All Fresh Vegetables	12,084,000	10	\$1.75	\$19,032,500
Rhubarb	6,550	8	\$1.25	\$7,500

Alternative Estimate of Fresh Vegetable Sales in Southeast Alaska

It is useful to compare the estimates above with ones derived from other sources. Unfortunately, there is no simple source for data on food expenditures in Alaska. This section describes an alternative method of estimating fresh vegetable sales in the region.

USDA estimates indicate that per capita food expenditures in 2014 (the latest year for which data are available) totaled \$2,282 for “food at home” and \$2,293 for “food away from home.” For various reasons, this analysis will only consider “food at home” expenditures, which are made up primarily of grocery store expenditures.¹²

While USDA per capita food expenditure data does not include estimates by state, the U.S. Bureau of Economic Analysis provides such estimates for “food and beverages purchased for off-premises consumption.”¹³ Because these estimates include beverages, only the ratio of per capita expenses in Alaska versus the nation (1.415) is useful.

¹² In 2014, on average, food at home expenditures broke down as follows: 60 percent at food stores, 27 percent at other stores, 3 percent for home delivery and mail order, 7 percent at farmer’s markets, and 3 percent via home production and donations.

¹³ In 2015, according to this BEA data set, Alaskans spent \$3,965 per capita on these expenses, compared to \$2,802 for the nation as a whole. For more information, see https://www.bea.gov/newsreleases/regional/pce/pce_newsrelease.htm.

Applying this ratio (which accounts for more expensive food in Alaska) it is estimated that, on average, Alaskans spend \$3,229 per capita on food at home each year. When this number is multiplied by the total residents of Southeast Alaska, it is estimated that \$240 million is spent annually in Southeast Alaska on food at home.

Finally, another national-level data source provides an estimate of the share of total food at home expenditures attributable to fresh vegetables (6.15 percent).¹⁴ Applying this rate to the estimated \$240 million spent in Southeast Alaska produces an estimate of \$14.8 million in fresh vegetable expenditures in Southeast Alaska annually. This amount is in line with the numbers presented in the table above, especially when considering that this estimate does not include fresh vegetables purchased by the region's restaurants and other food away from home establishments.

Food Consumption and Expenditure Trends

An analysis of food consumption and expenditure trends informs assumptions about possible future demand for local produce in Southeast Alaska.

FOOD EXPENDITURES IN COMPARISON TO OTHER EXPENDITURES

As incomes in the United States have risen over the last century, it is clear that these funds have largely been spent in categories other than food at home (such as health care). Per capita food at home expenditures in 1953 totaled \$1,129 (in 1988 dollars) and remained at roughly that level, with a value of \$1,126 in 2014 (in 1988 dollars). Meanwhile, food at home expenditures as a share of disposable personal income fell from 16 percent in 1953 to 5.5 percent in 2014.

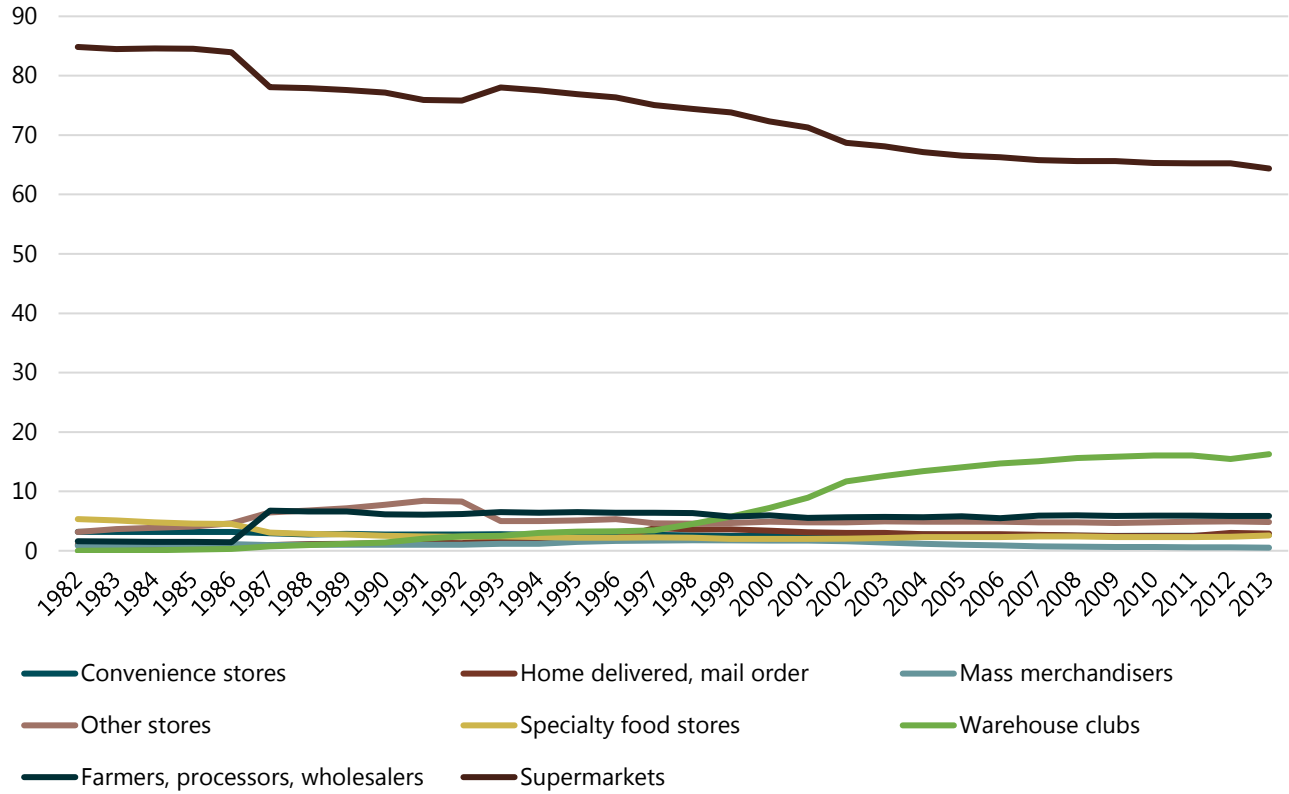
On the other hand, food away from home expenditures have grown considerably during this time period, from a per capita average of \$522 (1988 dollars) in 1953 to \$1,125 in 2014 (1988 dollars). As a share of total disposable personal income, however, food away from home expenditures have increased modestly from 3.4 percent to 4.3 percent over this time period.

FOOD AT HOME EXPENDITURES INCREASINGLY FROM WAREHOUSE CLUBS AND SUPERCENTERS

As shown in Figure 1, the share of food at home expenditures purchased at warehouse clubs and supercenters has increased in recent decades, from 4.5 percent in 1998 to 16.2 percent in 2014. Since 1982, purchases at supermarkets and other groceries have declined steadily from 84 percent to 64 percent in 2014. Other outlets account for relatively small shares of food at home expenditures.

¹⁴ Data from the Consumer Expenditure Survey, Bureau of Labor Statistics. For more information, see <https://www.bls.gov/cex/tables.htm#avgexp>.

Figure 1. Share of Food at Home Expenditures, by Outlet, 1970-2014



INCREASED CONSUMPTION OF FRESH VEGETABLES

As shown in Figure 2 below, from 1970 to 2014 per capita consumption of fresh vegetables has increased 20 percent, from 154 pounds to 186 pounds annually.

Figure 2. U.S. Per Capita Availability of All Fresh Vegetables Combined, 1970-2014, Pounds

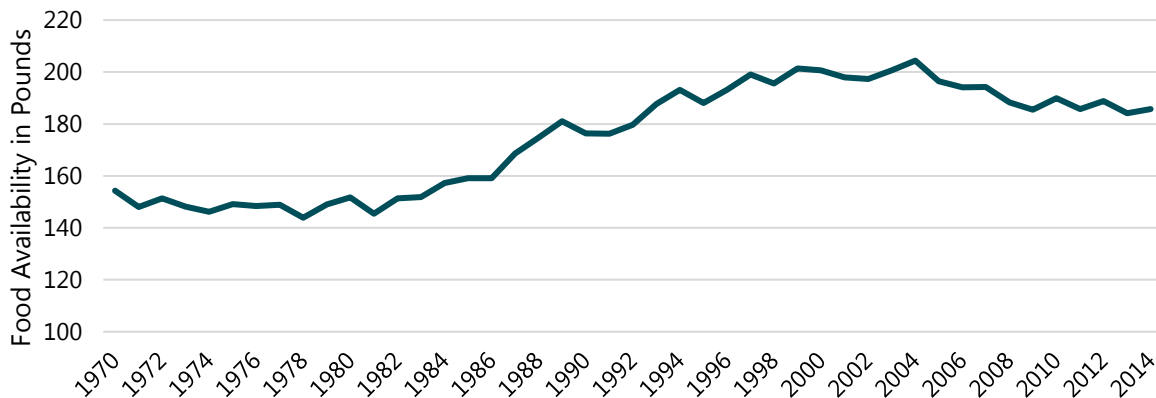


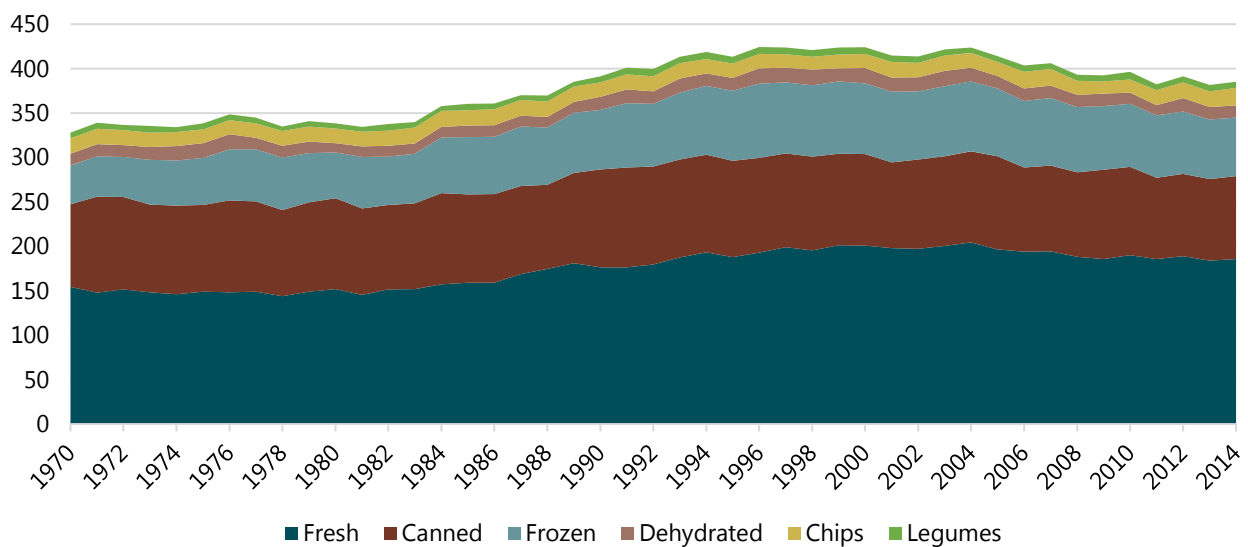
Table 7 provides data for selected vegetables and all fresh vegetables. These numbers are slightly higher than others included in this report, as they do not account for any waste.

Table 7. Per Capita Availability of Selected Vegetables and All Fresh Vegetables, 1970, 2014, and Percent Change 1970-2014

Fresh Vegetable	1970 Per Capita Consumption (Pounds)	2014 Per Capita Consumption (Pounds)	Percent Change 1970-2014
Potatoes	61.8	33.5	-46
Carrots	6.0	8.5	+42
Beets	1.8	0.6	-68
Garlic	0.4	1.9	+337
Squash	1.3	4.6	+245
Lettuce	26.0	25.4	-2
Cabbage	8.7	6.7	-23
Kale	0.4 (1997)	0.5	+22 (1997-2014)
All Fresh Vegetables	154	186	+20

As shown in Figure 3, fresh vegetable consumption, as a share of total vegetable consumption, has increased modestly in recent decades. From 1970 to 1979, fresh vegetable consumption averaged 44 percent of total vegetable consumption, increasing to 48 percent for the ten-year period ending 2014. Over the same periods, canned vegetable consumption decreased from 30 to 24 percent and frozen vegetable consumption increased from 15 to 18 percent. Other categories accounted for relatively small portions of total vegetable consumption and remained steady over the time period, including dehydrated vegetables (3-4%), chips (4-5%), and legumes (2 percent). For comparison purposed, all vegetables are converted to fresh weight equivalents.

Figure 3. Total Per Capita Vegetable Consumption, by Type of Processing, 1970-2014, Pounds



Economic Impacts of Fruit and Vegetable Production in Southeast Alaska

Background

Regional Economics and Economic Development

A simplistic but useful view of a regional economy is one in which there are basic and non-basic (support) industries. The basic industries are those that bring new money into the region through exports of goods and services. For Southeast Alaska, the main basic industries are tourism, fisheries, components of state and federal government, and mining. Non-basic (support) industries include health care, local government, education, retail, and various other industries that address the needs of the region's residents and businesses.

Relying on this view of an economy, regional economic development efforts generally try to either increase the employment and output of a region's basic industries or develop the region's support industries so that more of the needs of the region's businesses and residents are met with locally-produced goods. As an example of the latter, various types of commercial fishermen purchase nets to support their activities. While many of these purchases are undoubtedly with out of state suppliers, local businesses can carry the nets, or even assemble and repair them – keeping more of the benefits of the industry in the region.

Efforts to increase local food production fall into this second category of economic development. These efforts improve the region's economy to the extent that a dollar spent on local food (either to purchase food from a farmer or local purchases on growing supplies) is more likely to recirculate in the local economy than a dollar spent on imported food. This subject, also known as import substitution, is explored in more detail below.

ECONOMIC IMPACTS

Economic impact studies estimate the change in economic activity within a region resulting from an industry (or company, non-profit, community initiative, or other influence on the economy). The most widely used measures of economic activity are number of jobs, total labor income, and total sales/spending (sometimes termed "output").

Studies use various sources of data to calculate the direct impacts of an industry, such as the number of people employed by the industry, the wages and profits of the employees and owners, taxes paid, and total sales (as well as the portion of those sales that is added value over and above the cost of inputs).

Indirect and induced impacts are those resulting from spending in the region by businesses and employees, respectively, that receive money from the industry. Indirect and induced impacts are also known as multiplier effects, because they multiply the direct impacts through recirculation in the economy. These impacts are typically estimated using input-output models, such as IMPLAN.

Local Food Economic Impacts

Expansion of local food markets in recent decades has led to increased study of the economic impacts of these efforts. Despite increased attention, the topic is far from clear. As described in a widely-cited journal article:

Drawing overarching conclusions from these [local food economic impact assessments] is difficult. Data collection is challenging, and the handful of studies with transparent and well-defined methodologies have generally used data and modeling techniques with narrow geographic and market scope. While these studies have found positive regional economic impacts, the impacts have been modest, and many economic impacts of local food systems remain unexamined.¹⁵

In 2013, Michigan State University's Center for Regional Food Systems teamed up with the Union of Concerned Scientists' Food & Environment Program to host a meeting and address these issues. Their findings are in line with those in a recent USDA report, and include the following considerations:¹⁶

- While most studies focus on farmer's markets and direct marketing, local food is predominantly sold through retail outlets.
- Political and economic boundaries often overlap. Local food studies that arbitrarily focus on a political boundary can miss sales in nearby metropolitan areas and other key markets. Furthermore, determining what is defined as local food can involve arbitrary cutoffs that are open to debate.
- Obtaining data on local food sales is difficult as these sales are often not recorded formally and involve many small operations.
- Perhaps most significantly, many studies do not consider the opportunity costs of local food purchases, or what would have occurred in the absence of local food sales. Considering these opportunity costs requires asking a variety of questions such as,
 - Do local food purchases lead to increased consumption of fresh fruits and vegetables? If so, what food or other purchases do they replace?
 - Alternatively, do local food purchases merely displace purchases of imported produce? If so, what economic activities were supported by the sales of imported foods?
 - Do local food purchases lead to increased overall spending by households?
 - What is the net economic effect of purchases of local food?
- Benefits other than jobs and income are noted in some studies, though additional research is needed. These include increased sales at businesses near farmer's markets and increased levels of entrepreneurship resulting from a more developed local food system.
- While economic impacts are important to consider, such studies run the risk of drawing attention away from the many other benefits of developed local food systems, especially health benefits.

¹⁵ (O'Hara & Pirog, 2016)

¹⁶ (O'Hara & Pirog, 2016) and (Low, et al., 2015)

USDA Food Dollar Data

The USDA estimates that only 11.6 cents of the average food dollar spent in the United States goes to the farm and agribusiness sector.¹⁷ Sectors receiving the largest shares include food services (33.7 cents), food processing (18.6 cents), and retail trade (13.6 cents). Other sectors receive smaller percentage of food expenditures, including energy (6.8 cents), finance and insurance (4.4 cents), packaging (4 cents), transportation (3.5 cents), advertising (2 cents), and legal and accounting (1.8 cents). While the focus of this report is on fruits and vegetables specifically, it is useful to keep in mind the small portion of revenue generated from overall food sales that goes to the farmer.

Implications for Southeast Alaska

In some ways, Southeast Alaska is well-suited for a local food economic impact assessment. Southeast Alaska is a well-defined, isolated region, with few connections to areas with different political boundaries. The small size of the region's commercial growing industry means that a significant portion of the industry could be interviewed within a reasonable time and budget. Lastly, few local farmers sell through retail outlets, and basically none export their production out of the region.

On the other hand, the small size of the commercial growing industry magnifies the relative influence of the (poorly-understood) opportunity costs described above. It also led this study to consider household production of local foods, which introduces new questions and opportunity costs generally not considered in studies of local food systems. For instance, do household growers spend more or less in the regional economy as a result of growing their own food? What is the net effect of shifting retail food purchases to retail purchases of seeds and other growing inputs?

Southeast Alaska Local Produce Economic Impacts

Economic Impacts of Commercial Production

As detailed in other sections of this report, roughly 30 Southeast Alaska growers sold substantial amounts of fruits and vegetables in 2016, with combined gross revenue from all of these growers estimated at \$180,000. The majority of these sales occur directly between growers and consumers, with small amounts of sales via grocery stores and other retail outlets. It is estimated that 56 percent of sales, or \$100,000, is spent on inputs and other expenses.

Including the multiplier effects of these expenses and profits, the annual economic output attributable to Southeast Alaska commercial fruit and vegetable production is estimated at \$250,000 to \$300,000.

¹⁷ (Canning, 2011)

Economic Impacts of Home Production

An estimated 11,034 Southeast Alaska households grew food in 2016, producing roughly 800,000 pounds of fruits and vegetables. While there is no perfect way to estimate the value of this production, a replacement cost approach results in a value between \$1.4 million (replacing with standard quality produce) and \$2.8 million (replacing with a combination of organic and premium quality produce). For purposes of this study, the average between the two estimates, \$2.1 million, is the best available estimate of the value of fruits and vegetables grown by Southeast Alaska households.

Southeast Alaska households spent an estimated \$1.7 million in inputs and other goods and services to support growing food. The difference between the estimated value and the cost of growing indicates that households, on average, receive an economic benefit from growing. A precise estimate of this benefit would require considering the opportunity cost of time spent gardening; the health and other benefits of growing, eating, and sharing locally-grown food; and other considerations that are beyond the scope of this study.

Most households surveyed agreed that as a result of growing their own food, the household spends less money on food overall (68 percent agreed), eats more vegetables (67 percent agreed), and is more physically active (71 percent agreed). In addition, respondents surveyed had an average of 14 years of experience growing food in Southeast Alaska. Clearly, the households that are producing food find their activities worthwhile or they would not undertake these activities. This study provides a first-of-its kind baseline estimate of the growing activity in Southeast Alaska, allowing future efforts to measure changes over time.

Potential Impacts of Increased Local Production

This study includes a consideration of the economic impacts associated with a much more developed local food system in Southeast Alaska. Such a system could conceivably arise from a cultural shift that increased interest in eating and growing local food, combined with economic development and public policy efforts to encourage this trend. Under this scenario, policies would need to be adopted to support affordable purchase or lease of land for agricultural purposes and reduce the price of shipping produce from rural areas to urban markets. In addition, if national trends are followed, strong growth in intermediated sales of local foods – such as through food hubs and grocery stores – will be required.¹⁸

For purposes of this study, the project team selected a highly ambitious but not impossible scenario in which local commercial production and sales are five times current levels and household production is double current levels. Under this scenario, each year a total of 1.75 million pounds of fruits and vegetables would be produced with \$3.88 million in total associated expenditures and \$900,000 in total commercial sales.

The scenario developed is not meant as a prediction but an exercise to demonstrate the potential economic impact resulting from efforts to increase local produce production and consumption in Southeast Alaska.

¹⁸ (Low & Vogel, 2011), (Canning, 2011), and (Matson, Sullins, & Cook, 2013)

Potential Economic Impacts

Under this scenario, economic output attributable to the production of fruits and vegetables in Southeast Alaska would total approximately \$1.4 million annually, including direct, indirect, and induced impacts. This number reflects the change in economic activity expected as a result of increased *commercial* food production in the region, and does not include any impacts resulting from increased *household* production (as explained below).

Increased commercial production and sales of locally grown produce can be assumed to replace retail purchases of imported food. Under the scenario described, increased commercial production increases economic output in the regional economy because money spent with local farmers is more likely to be respent in the economy than money spent on imported food.

OTHER IMPACTS NOT QUANTIFIED

Additional economic and other impacts are relevant to this discussion, but are not typically included in economic impact studies.

Shifting spending from grocery stores to hardware and garden supply stores – the most significant net effect of increased levels of household production – will in theory result in a modest but net positive economic impact on the region. Because hardware stores have higher margins and are somewhat more likely to be locally owned, money spent at a hardware/garden supply store is less likely to immediately leak out of the region. Determining the precise scope and influence of these impacts, however, requires original data collection outside the scope of this study.

Additional benefits are excluded because consumer preferences are not fully revealed in any marketplace. These include the health benefits of eating more fruits and vegetables, the environmental benefits of decreased greenhouse gas emissions, and other impacts. Economists, typically in the context of academic research, employ a variety of methods to value non-market goods, including hedonic pricing models and contingent valuation studies, among others.

Recommendations to Increase Production and Associated Economic Impacts

Southeast Alaska's local food system includes an impressive amount of gardening and home production of fruits and vegetables. Clearly, there is a high degree of interest in and experience with growing food in the region. On the other hand, commercial production is limited. Building on the lessons learned from various steps in this study – especially the household survey, interviews with commercial growers, and analysis of various secondary data sources – the following considerations and recommendations explore the causes of this discrepancy, and point to a path toward increased production of locally-produced fruits and vegetables, and associated economic impacts, in the region.

Most Growing Occurs at the Household Level

Household production accounts for roughly 96 percent of the region's total production of fruits and vegetables by weight and roughly 94 percent by value. The rest of the production is attributable to growing by commercial operations. The importance of household growing is further underscored by the fact that most commercial operations were started for household use and retain a dual function.

High Costs of Land and Labor Limit Growth of the Industry

Commercial growers – as well as nearly all private industry in the region – frequently point to the high price of land and labor as key barriers to their growth. Land costs are high because the overwhelming majority of land is owned by the federal government and not available for development. Additionally, most soils in Southeast Alaska are shallow and not considered readily conducive to agriculture. Labor costs are high in the region due to the high cost of living and relatively low unemployment rate, particularly during the growing season.

Households can partially sidestep both of these issues, as most have access to at least some land as well as leisure time to devote to growing food. Even so, household growers report insufficient time and land as the top two barriers to increasing production.

Commercial Growing Accounts for Nearly All Measurable Economic Impacts

The measurable economic impacts associated with increased household production are minimal, largely limited to those resulting from shifting purchases from imported food to a mix of imported and locally-produced supplies needed to grow food. Households also benefit from a supply of healthy food and a small savings in total spending, but these benefits are not quantified in this study and not generally considered in economic impact studies.

Commercial production directly adds value to the region's economy, and stimulates additional spending by businesses and households in the region. However, these economic impacts in Southeast Alaska are limited, totaling only \$250,000 to \$300,000 in 2016 and \$1.4 million under a scenario of very aggressive growth in the industry.

Recommendations

With these considerations in mind, the project team offers the following recommendations relevant to efforts to increase the production of local fruits and vegetables, and the associated economic impacts, in the region:

- A focus on increasing commercial growing and sales will have the largest impact on the economy. In particular, the following types of activities will have the greatest economic impact:
 - Exporting goods out of the region.
 - Stimulating additional spending by visitors from outside the region, such as through sales of local food to area restaurants, tourist lodges, and cruise ships.
 - Replacing purchases that are currently filled by businesses outside the region, such as some cruise ship food purchases, Full Circle Farm boxes, and online food purchases.
 - Adding value through increased processing of local produce.
- To increase the region's commercial production, the primary focus should be on encouraging household producers and small-scale commercial growers to scale up and start selling or sell more of their produce.
 - Such efforts will also increase entrepreneurship in the region, leading to additional benefits throughout the economy.
- There is room for more large-scale farms in the region, but the issues facing these operations are many, the failure rate is likely to be high, and the reasons behind each successful operation are more likely to be unique than readily applicable to other farms.
- Efforts should also consider the spillover between locally grown food and other agricultural industries in Southeast, such as landscaping and nurseries. Because many of the skills and equipment required are similar, economies of scale can be taken advantage of between these types of operations.
- Food growers in Southeast Alaska spend an estimated \$1.8 million each year to support their growing activities. These include purchases of soil, soil amendments, lumber, hardware, growing supplies, seeds, pots, and other goods and services. Efforts to increase the local production and sales of these inputs has immediate potential to increase the economic impact of the local food system.
- The role of intermediated sales will need to increase to accelerate purchasing of local produce. The proposed food hub addresses this need, but should not primarily rely on local food purchases for sustaining revenue, as these sales are currently minimal.
 - Substantial marketing is needed to inform consumers about local food buying options, including both farmer's markets and the proposed food hub. These efforts will benefit from advance planning and early involvement of commercial growers.

- Experimentation with ways to increase the efficiency of medium-sized commercial growing operations – such as through specialization, automation, and mechanization – could yield valuable information for growers throughout the region.
 - Indoor growing – such as in high tunnels, greenhouses, and even indoors through hydroponic and other techniques – is growing in popularity in the region, especially among commercial growers. These systems have various benefits, most notably extending the growing season and allowing cultivation of popular crops such as tomatoes and cucumbers. In addition, these systems result in a more controlled growing environment and can be set up to reduce labor requirements.

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Appendix A: Household Survey Topline Results

For percentages, totals may not sum to 100 due to rounding.

Q1. What community do you currently live in?

n=205	% of Total
Juneau, Auke Bay, Douglas	45
Sitka	12
Ketchikan	9
Wrangell	8
Petersburg	7
Haines	6
Craig	2
Hoonah	2
Gustavus	2
Skagway	2
Angoon	1
Hydaburg	1
Klawock	1
Take	1
Metlakatla	1

Q2: In 2016, did you or any members of your household grow food...

n=204	% of Total
In your yard	84
Inside your house in pots	33
In a greenhouse or sunroom	32
At a community garden	4
Other	2
Don't Know/Refused	1

Q3-10: Please tell me if you, or anyone in your household, grew the following types of foods in 2016:

n=205	% of Total
Fruits, such as rhubarb, currants, and raspberries	78
Rhubarb	57
Raspberries	41
Strawberries	30
Apples	14
Currants	11
Cherries	10
Gooseberries	5

Other (tayberries, ground cherries, pears, citrus)	15
Herbs	70
Basil	37
Chives	36
Mint	28
Thyme	28
Parsley	24
Rosemary	23
Cilantro	22
Oregano	18
Sage	17
Dill	10
Other (marjoram, lemon verbena, lavender, sorrel, catnip, valarium, lemongrass, lemon balm, tarragon, bee balm, nasturtiums)	9
Root crops, such as potatoes, carrots, and beets	66
Potatoes	51
Carrots	46
Beets	19
Radishes	11
Turnips or Rutabagas	5
Parsnips	4
Warm weather crops, such as zucchini, squash, and tomatoes	57
Tomatoes	39
Zucchini/summer squash	34
Peppers	13
Cucumbers	11
Other (ginger, melon, corn, pumpkin,	2
Any kind of lettuce, kale, or other greens	52
Lettuce, all types	39
Kale	28
Spinach	15
Chard	12
Arugula	6
Mustard greens	3
Asian greens	1
Other (bok choy, collards, dandelion, watercress)	2
Other vegetables, such as cabbage	44
Peas	35
Cabbage	15
Beans	13
Broccoli	11
Cauliflower	6
Fennel	2
Brussel sprouts	2
Kholrabi	2

Other (celery, asparagus, artichoke, cardoon)	3
Bulb vegetables, such as garlic and onions	38
Onions	28
Garlic	24
Leeks	4
Shallots	3
Green Onions	1
Other fruit or vegetables (oats, taro, sea beans)	2

Q11: Of all the food you grew in 2016, can you estimate what percentage will have gone unharvested by the end of the year?

n=205	% of Total
0%	34
1-5%	18
6-10%	14
11-20%	12
21-30%	6
31-100%	11
Don't know/Refused	5
Mean	13%

Q11a: Of all the food harvested by your household this year, can you estimate about what percentage was:

n=205	% of Total
Consumed by your household	
0-24%	0
25-49%	2
50-74%	20
75-100	76
Don't know/Refused	2
Mean	85%
Shared with family or friends	
0-24%	73
25-49%	12
50-74%	12
75-100	1
Don't know/Refused	2
Mean	15%
Shared with family or friends	
0-24%	
25-49%	
50-74%	

75-100

Don't know/Refused

Mean 4%

Q12-21: Quantity of Crops Grown by Your Household in 2016:

n=205	Mean	n
Q12: How many pounds of potatoes did you harvest?	24.2	104
Q12a: About how many potato plants did you grow?	16.2	104
Q13: How many pounds of carrots did you harvest?	16	95
Q13a: About how many feet of carrot rows did you grow, in total?	19.3	95
Q14: How many beets did you harvest?	14.2	39
Q14a: About how many feet of beet rows did you grow, in total?	9.7	39
Q15: How many rhubarb plants did you grow?	4.6	118
Q16: How many heads of garlic did you harvest?	40.4	49
Q17: Imagine a gallon bag of herbs. Including all types of herbs, please estimate how many gallon bags of herbs you harvested.	5.8	144
Q18: How many zucchini or summer squash plants did you grow?	5.7	69
Q19: Imagine a gallon bag of salad greens. Including all types, please estimate how many gallon bags of salad greens you harvested.	10.6	107
Q20: How many heads of cabbage did you harvest?	9.6	30
Q21: How many kale plants did you grow for food?	11.2	57

Q22: Thinking about the total amount of all kinds of food your household grew in 2016, would you say that your 2016 harvest was better, worse, or about the same as your harvests over the last few years?

n=205	% of Total
Better	37
Worse	22
About the same	25
Don't know	3
First-time growing	12

Q23: Would you like to have grown more food in 2016 than your household actually did?

n=205	% of Total
Yes	71
No	27
Don't know	2

Q24: What barriers kept you from growing more food in 2016?

n=147	% of Total
Too busy/time	48
Not enough garden space	31
Weather	11
Pests	8
Money/cost	7
Knowledge/skills	6
Physical ability/health	6
Other	5

Q25: Please estimate about what percentage of your household's total vegetable consumption during summer months was grown by your household in 2016.

n=205	% of Total
<5%	23
5-9%	14
10-19%	19
20-39%	16
40-59%	8
60%+	15
Don't know/Refused	5
Mean	24.1

Q26: Including all your spending on seeds, starts, fertilizers, soil, compost, containers/pots, and gardening tools, about how much did your household spend, in total, on growing food in 2016?

n=205	% of Total
\$0	6
\$1-\$50	33
\$51-\$100	21
\$101-\$200	14
\$201-\$300	9
\$301+	12
Don't know/Refused	5
Mean	148.1

Q27: Thinking about your household's total spending to support growing food in 2016, was it more, less, or about the same as in the last few years?

n=205	% of Total
More	17
Less	21

About the same	48
Don't know	1
First-time growing	12

Q28: For each of the following statements please tell me whether you strongly agree, agree, disagree, or strongly disagree with each statement. As a result of growing your own food, your household:

n=205	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know/Refused
a. Eats more vegetables	20	47	26	3	4
b. Eats healthier food	28	50	19	1	2
c. Is more physically active	19	52	25	0	5
d. Spends less money on food overall	13	50	31	2	4
e. Is willing to pay more to buy better quality vegetables at the store	18	48	27	3	5
f. Is more involved in your community	5	37	50	1	7

Q29: About how many years have you been growing food in Southeast Alaska?

n=205	% of Total
1-4	24
5-9	23
10-14	14
15-19	7
20-29	15
30+	16
Don't know/Refused	1
Mean	13.7

Q30: In 2016 did your household grow food organically?

n=205	% of Total
Yes	75
No	21
Don't know	4

Q31: Did your household raise any animals for meat, dairy, eggs, or honey in 2016? Which ones?

n=204	% of Total
Chickens	11
Goats	1
Bees/Honey	0
Ducks	0
Cows/Beef	0

Turkeys	0
Refused	0
Other	1

Q32: Did you, or anyone in your household, harvest wild blueberries or huckleberries in 2016?

n=205	% of Total
Yes	75
No	23
Don't know	2

Q32a: Please estimate how many gallons of wild blueberries and huckleberries your household picked in 2016.

n=154	% of Total
Mean	5.8

Q33: If locally-harvested wild blueberries were available as a frozen product at your local grocery store, would you consider purchasing them?

n=205	% of Total
Yes	49
No	47
Don't know	4

Q33a: About how many pounds per year do you think you would purchase at \$6 a pound?

n=101	% of Total
Mean	7.9

Q34: In what year were you born? (Age)

n=201	% of Total
18-24	1
25-34	9
35-44	12
45-54	18
55-64	27
65+	33
Mean	56.3

Q35: Including yourself, how many people live in your household for at least 6 months out of the year?

n=205	% of Total
--------------	-------------------

1	17
2	40
3	21
4	11
5+	9
Don't know/Refused	2
Mean	2.6

Q35a: Of the people in your household, how many are children age 17 or under?

n=201	% of Total
0	75
1	9
2	9
3	3
4	2
5+	1
Don't know	0
Mean	0.5

Q36: Please stop me at the category that best describes your total combined household income before taxes for last year.

n=205	% of Total
Less than \$15,000	3
\$15,001 to \$25,000	3
\$25,001 to \$50,000	13
\$50,001 to \$75,000	18
\$75,001 to \$100,000	19
\$100,001 to \$125,000	13
Over \$125,000	15
Don't know	1
Refused	16
Mean	85.1

Q37: Which racial or ethnic group do you most closely identify with?

n=205	% of Total
White	76
Alaska Native	10
Hispanic or Latino	2
Asian	2
Black or African-American	1
American Indian	1

Native Hawaiian or Pacific Islander	1
Other	2
Don't know/Refused	8

Q38: Gender

n=205	% of Total
Male	33
Female	68

Appendix B: Household Survey Instrument

Appendix C: Commercial Grower Interview Protocol

Name of Grower and Business _____ Community _____

Thanks for your involvement in this project, which aims to build support for developing Southeast Alaska’s local food system by educating regional leaders about the economics of the industry. Please see project description below for more information.

NOTE: This survey covers food grown and sold commercially. Please do not include amounts or expenses related to growing for your own household. Best guesses are fine.

1. Did you grow any of the following crops in 2016? If so, please estimate the total pounds, if any, you **sold** in 2016. Your best guess is fine.

	Yes?	How Much?	Comments
carrots,			
potatoes,			
garlic,			
beets,			
herbs,			
lettuce,			
rhubarb,			
zucchini or yellow squash,			
Cabbage			
Kale			

- a. What other crops did you sell in significant quantities? Which were the most important economically?
- b. Do you anticipate any major changes to your operation in the next year or two?
- c. How many acres or square feet do you actively garden? Your best guess is fine.
- d. Do you have a high tunnel? Any unusual growing methods (aquaponics, hydroponics, etc.)?

2. Considering all your sales of locally grown food, can you estimate your total gross sales in 2016?

3. Considering all expenditures to support your growing operation (seeds, soil amendments, tools, equipment, gas, parts, transportation, packing supplies, etc.), what was your estimated total expenditures in 2016?
 - a. About what percentage of your total 2016 expenditures were purchased from Southeast Alaska-based businesses compared to all other sources? Your best guess if fine.

 - b. Please briefly describe any major capital purchases (over \$5,000), if any, in the last 3-5 years?

4. Is the financial performance of your operation critical to its continuation?
 - a. If YES, what level of sales or profit you need to be sustainable?

 - b. If NO, please describe what motivations and results keep your operation going . . .

5. In your opinion, what efforts would have the greatest potential to increase the scale and economic impact of Southeast Alaska's local food system?

Project Description: Potential Economic Impacts of Localizing Southeast Alaska's Food System

This project will quantify the economic impacts of Southeast Alaska's local food production. Components of the project include estimation of:

- Total annual consumption of ten produce items (carrots, potatoes, garlic, beets, herbs, lettuce, rhubarb, squash, cabbage, kale, and blueberries).
- Annual import volume of the above foods, as well as total value of these imports (including portion of value added through transportation).
- Annual local production volume for foods on target list, including production by home gardeners, commercial operations, and wild harvest for blueberries.
- Economic impacts in Southeast Alaska resulting from production of foods on target list. These impacts would be measured both at current levels of production and at high, medium, and low estimates of increased production in the future.
- Recommendations for increasing production in the region, including an assessment of the key barriers and opportunities.

We appreciate any information you are willing to share, and will keep your responses confidential and only present data in summaries that include all commercial growers in Southeast Alaska. **Thanks for your support**

of this project, which helps generate support for local food efforts by educating regional leaders about the industry.

Thank you!

Appendix D: Blueberry Addendum

This addendum to the report *Current and Potential Economic Impacts of Locally-Grown Produce in Southeast Alaska* provides information relevant to wild blueberry harvests and blueberry consumption in Southeast Alaska. The January 2017 McDowell Group report mentioned above addresses locally-grown fruits and vegetables in Southeast Alaska, and included a random sample telephone survey of Southeast Alaska households. See the report for a description of the survey and other methodology.

Wild Blueberry Harvesting and Consumption

Southeast Alaska is home to several species commonly known as blueberries and/or huckleberries. This report makes no distinction between these berries and addresses them collectively.

The primary purpose of the survey described above was to assess locally grown food. However, because telephone surveying is expensive the opportunity was taken to include several questions on blueberry/huckleberry harvests in 2016. Because only households that grew food in 2016 were surveyed, the responses to the blueberry questions must be interpreted carefully. Of Southeast Alaska's growing households, survey results indicate 75 percent also picked wild blueberries in 2016.¹⁹ Households that picked blueberries were asked how many gallons they harvested in 2016. The mean response was 5.8 gallons.

These results do not reflect the rate of blueberry harvesting for all Southeast Alaska households. For comparison, a non-random sample of 35 households that did not grow food were asked whether they harvested wild blueberries in 2016. Only 43 percent of these household did so, much less than the 75 percent of growing households. While this sample was not randomly distributed around Southeast Alaska, and is very small, the results are useful for informing a conceptual analysis of wild blueberry harvests in Southeast Alaska.

Using conservative assumptions (45 to 55 percent of households harvested blueberries and an average per household harvest of 3 gallons), Southeast Alaska's households harvested roughly 40-50,000 gallons of wild blueberries in 2016. At 4.5 pounds per gallon, this is equivalent to 180-220,000 pounds of wild blueberries, or 3.6 pounds per capita for the midpoint of this range. These numbers are provided as a point of reference only, and are not considered formal estimates. The USDA's Economic Research Service estimates blueberry use (wild and cultivated) at 2.17 pounds per capita in the U.S. in 2014 – up from less than 1 pound in 2007.

Wild Blueberry Sales

Additional survey questions ask households about their interest in purchasing frozen wild blueberries. Roughly half (49 percent) said they would consider purchasing wild blueberries if they were available as a frozen product

¹⁹ An estimated 38 percent of Southeast Alaska's 30,026 households grew food in 2016, according to survey results.

at their local grocery store. Interestingly, there was no significant difference in interest between households that reported picking blueberries and those that did not.

Households that would consider purchasing wild blueberries estimated they would purchase about 8 pounds at \$6 per pound. The survey did not estimate demand at other prices, and is meant as a point of reference only.

Summary

Enough interest appears to be present to warrant further exploration of local and other markets for wild blueberries. Based on survey analysis, the harvest and sale of wild blueberries could provide seasonal employment opportunities for residents of Southeast. These findings may be especially promising for residents of rural communities where opportunities for cash incomes are limited.

A more detailed analysis of wild blueberry opportunities would include consideration of the following key topics:

- Various product quality and safety issues.
- Characterization of key marketing and distribution channels, including the potential to sell to commercial buyers such as restaurants.
- High transportation expenses between villages with ample blueberry resources and workforce capacity and urban or export markets.
- With respect to export markets, the degree of differentiation from other wild blueberries should be determined. In Maine alone, 44,000 acres of wild blueberries are tended, with up to 100 million pounds of berries harvested annually.²⁰ According to the University of Maine Cooperative Extension Service, Maine's wild blueberries are grown on a two-year cycle, with a year of rest in-between harvests.²¹ Harvests are largely accomplished using mechanized equipment, and are followed by pruning blueberry fields to the ground by mowing or burning.

²⁰ <https://extension.umaine.edu/blueberries/wp-content/uploads/sites/56/2009/11/WBC-14466-EcoImpactState.pdf>

²¹ <https://extension.umaine.edu/blueberries/>