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# Garlic Enterprise Analysis

A STUDY OF THE RETURNS TO GARLIC PRODUCTION IN MINNESOTA

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**October 2018**

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USDA Agricultural Food Research Initiative (AFRI)

**Partners:**

Regional Sustainable Development Partnerships, University of Minnesota  
Sustainable Farming Association

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**A special thanks to all growers who participated in this research and shared information about their operations.**

**We hope this research helps existing growers improve their operations and assist prospective operators in planning reasonable winter greenhouse projects.**

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## EXECUTIVE SUMMARY

A University of Minnesota Extension analysis of eight garlic enterprises in Minnesota found they are operating profitably. Operations were relatively modest, however, ranging between 0.02 and 0.2 acres in size. The smallest and largest operations grew 89 and 1,112 pounds of garlic, respectively. During the 2017 season, nearly all sales were directly to consumers, with an average price of \$9.16 per pound.

Each of the eight growers spent \$4.93 on average to produce a pound of garlic. This breakeven price covers all production and marketing costs. It also includes cash expenses (e.g., fertilizer) and non-cash expenses (e.g., garlic saved for seed, which is by far the largest expense), but it does not include proprietor labor costs. Study participants spent 190 hours on average to operate their garlic enterprise, from planting seed in 2016 to selling garlic in 2017. If valued at \$10/hour, proprietor labor costs would nearly double the group's breakeven price to \$8.57, although these prices varied between individual operations.

Based on study findings, some main points to consider when starting or operating a garlic enterprise include:

### **#1: Modest production and profitability**

The farms that participated in this study grew between 0.2 and 0.02 acres of garlic, almost exclusively with family labor and the casual help of friends. As such, these are not large operations and total sales reflect this fact. Total garlic sales ranged between \$895 and \$8,500, with an average of \$3,914. After removing production and marketing costs, study participants had an overall gross margin of 34 percent—that is, they kept 34 cents of every dollar sold after accounting for expenses.

### **#2: Profitability mostly tied to price and yield**

The study's two most profitable garlic growers reached financial success in two ways. One (Farm G) had a lower than average yield (low number of pounds of garlic per square foot) but obtained a very high price. In this case, all sales were direct-to-consumer, including those through a Community Supported Agriculture (CSA) arrangement. This fact could have overstated the garlic's value since it was sold as a bundle and not alone.

The second grower (Farm F) received a lower than average price (\$5.15 per pound) but had low production costs and a very high yield. Coupled with its low production costs, this farm was the most profitable. It should be noted, however, that both of these farms may be outliers, as they cultivated the smallest areas of garlic in the study. Marketing a very small crop of garlic at a high price, or obtaining a high yield with low production costs, is easier on a small scale rather than a large one.

### **#3: Cost of seed will impact profitability during start-up season**

The biggest expense for garlic growers was garlic seed. The cost of garlic seed (almost all of it saved from the previous year) was 53 percent of total expenses for the group. If a garlic grower purchased all seed at the going rate of \$12 per pound instead of using their own saved seed, their cash outlay would significantly affect profitability. For a beginner grower, it is safe to assume this would be the case. In this analysis, garlic saved for seed was valued at \$12 per pound and included as an expense, albeit a non-cash expense. If the value of garlic saved for seed was not included, the overall profitability of study participants would double. Their overall gross margin would also increase from 34 percent to 68 percent.



## INTRODUCTION

Events like the Sustainable Farming Association's Garlic Fest and general consumer interest in garlic have brought increased attention to the crop (Phaneuf, 2018). Current and potential growers are interested in more information about its financial returns. Little published data on garlic exists, however, especially in the Upper Midwest.

The purpose of this analysis is threefold. First, these findings will assist both current and potential garlic growers in business planning. Second, the data about marketing costs may assist the grocery backhaul team (the sponsor of this research) in calculating the potential savings of their activities with garlic producers. The backhaul team is piloting the feasibility of a new model for garlic growers to access wholesale markets. The growers will use the existing network of rural grocery stores and their wholesale suppliers to backhaul locally grown produce on emptied wholesale trucks for redistribution through wholesale markets. Third, the study's eight participating growers can use information from the study to benchmark their business. A comparison with similar operations may stimulate ways to revise current production and marketing practices and increase profitability.

## METHODOLOGY

Detailed information about annual operating costs, marketing costs, and labor inputs was collected from eight garlic operators in Minnesota.

In February 2018, University of Minnesota conducted an online survey of garlic growers in Minnesota. This was done in partnership with the Sustainable Farming Association of Minnesota to profile current practices and production in the state. Seventeen prospective participants expressed interest in participating in the survey's financial analysis. Of the 17, however, only nine elected to participate in this study. All but one grower provided enough information for a complete enterprise analysis.

### Data Collection Procedure

During spring 2018, participants were recruited either by phone or email through contact information they provided while taking the online survey. Participants received data collection spreadsheets to fill out regarding production and marketing costs, as well as labor inputs. Some participants mailed in their data while others elected to share information via a phone interview with the author. Individual financial records were used to complete the spreadsheets, and while many respondents generally had accurate and precise records, some at times estimated figures based on past production experience. Consequently, these estimates may affect the precision of study findings.

### Calculations and Comparisons

A primary goal of the backhaul project is to research the potential decrease in marketing costs by backhauling garlic to a nearby rural grocery store (rather than incurring direct marketing costs). As such, this analysis separates marketing costs from production costs. In this study, marketing costs include all post-harvest expenses to ready, transport, and sell a crop. This includes post-harvest packaging, mileage costs, advertising costs (including vendor stall fees), and farm insurance.

If a farm grew crops other than garlic, costs related specifically to garlic were based on either portion of sales or use within the garlic enterprise. For example, \$500 of farm insurance for the entire farm would be allocated to garlic regarding sales, while the cost of mulch that was used for

garlic would be considered a cost specifically related to the garlic enterprise. Other assumptions are noted throughout the report.

## GARLIC ENTERPRISE FINDINGS

The garlic operators who participated in this study varied significantly in their annual operating costs and returns, as well as start-up costs.

### Production Expenses

Production expenses were the main factor in garlic production, in particular the value of saved seed. The value of seed accounted for 53 percent of all production expenses for the 2016-17 growing season. All other production expenses were less than 10 percent (Figure 1).

**Figure 1: Production expenses (\*non-cash expense)**

	% of total expenses
<b>Value of saved seed used for 2017*</b>	53%
<b>Fertilizer</b>	6%
<b>Hired labor</b>	6%
<b>Seed purchased</b>	5%
<b>Electricity</b>	5%
<b>Production Supplies</b>	3%
<b>Repairs, maintenance</b>	3%
<b>Mulch</b>	2%
<b>Custom hire</b>	1%
<b>Machinery cost (calculated):</b>	1%
<b>Fuel and oil</b>	0%

Study participants were asked to value the seed they used in fall 2016. Almost all used \$12/lb. in their estimates. Multiplying \$12/lb. by the total amount of garlic saved from the 2016 season, participants spent an average of \$12,805 per acre, or \$0.29 per square foot in seed. Though saved seed was the largest expense, five of the seven farms also purchased seed in addition to saving it. It should be noted that the saved seed was given a value in the enterprise analysis, but it is a non-cash expense. That is, the grower did not spend money for the seed, but the value of the expense is still considered a cost.

### Post-Harvest and Marketing Expenses

All operators marketed their product almost exclusively direct to consumer, whether through festivals, farmers markets, or Community Supported Agriculture (CSA) arrangements. Although operators had a single outlet through which a majority of their garlic sold, almost all growers sold through a mix of marketing channels. Their return per marketing channel was calculated, but the results are too detailed and specific to individual farms to be presented in this report.

**Figure 2: Post-harvest and marketing expenses (n=8)**

	% of Total expenses
<b>Mileage (0.545/mile)</b>	4%
<b>Advertising/marketing</b>	4%
<b>Post-harvest packaging and labels</b>	3%
<b>Marketing supplies (displays, canopy, etc.)</b>	1%
<b>Farm insurance</b>	1%
<b>Hired Labor: sales</b>	0%
<b>Phone</b>	0%
<b>Internet</b>	0%

Part of the backhaul project's aim is to better understand the direct marketing costs incurred by growers and how these costs compare to backhauling into the wholesale market. The largest expense of marketing garlic was mileage expense (Figure 2).

### Operating Costs and Returns

Gross revenue for operators ranged from \$895 to \$8,516. Removing production costs necessary to grow a crop (seed, soil mix, and fuel), all but one grower had positive operating revenue (gross revenue minus enterprise costs). Converting to operating revenue per square foot of growing space, participants took in an average of nearly \$0.30 per square foot, ranging from -\$0.01 to \$0.89 (Figure 3).

A common way of presenting operating revenue is through a measure of gross margin. Calculated as operating revenue divided by gross revenue, gross margin is a percentage of gross sales an operator retains after removing direct expenses to produce a crop. For example, one grower kept 65 cents of every dollar he or she sold and therefore had a gross margin of 65 percent. Study participants experienced a gross margin that ranged from -4 percent to 65 percent, with an average gross margin of 34 percent (Figure 3).

**Figure 3: Gross revenue and operating revenue (n=8)**

	Farm A	Farm B	Farm C	Farm D	Farm E	Farm F	Farm G	Farm H	Total
<b>Gross revenue</b>	\$5,376	\$6,865	\$8,516	\$1,286	\$895	\$1,625	\$1,370	\$5,378	\$31,311
<b>Expenses</b>	\$2,613	\$4,763	\$7,021	\$693	\$934	\$570	\$592	\$3,392	\$20,578
Production expenses	\$1,999	\$4,226	\$6,026	\$651	\$691	\$537	\$433	\$3,092	\$17,654
Marketing expenses	\$614	\$537	\$995	\$42	\$244	\$33	\$159	\$300	\$2,924
<b>Operating revenue</b>	\$2,763	\$2,102	\$1,495	\$593	\$(39)	\$1,055	\$778	\$1,758	\$10,505
<b>Operating revenue per Sq. Ft</b>	\$0.54	\$0.24	\$0.38	\$0.34	\$(0.01)	\$0.65	\$0.89	\$0.22	\$0.28
<b>Gross margin</b>	51%	31%	18%	46%	-4%	65%	57%	33%	34%

Marketing expenses are a relatively small portion of total costs (15 percent on average), which has implications for those looking to sell through various marketing channels. If an operator decreased marketing costs by half, it would not make a significant change on total expenses.

## Labor Inputs and Returns

Each operator was asked to estimate the time he or she spent on production and marketing activities related to garlic. Participants spent the most time cleaning and curing garlic, followed by marketing and planting (Figure 4).

**Figure 4: Total labor of participating operations by task (n=8)**

	Total of all operations	% of total time
<b>Cleaning and curing</b>	475	31%
<b>Marketing (selling, set-up, travel)</b>	269	18%
<b>Planting</b>	224	15%
<b>Harvesting</b>	223	15%
<b>Weeding</b>	166	11%
<b>Removing scapes</b>	56	4%
<b>Field preparation</b>	48	3%
<b>Mulching</b>	46	3%
<b>Irrigation set up</b>	10	1%

As a group, study participants spent on average of 190 hours to grow and sell a crop of garlic. Presented as an hourly wage, operators made between -\$0.27 and \$13.90 when calculated as operating revenue divided by total time spent working (Figure 5). On average, growers earned \$6.93 for each hour worked after subtracting production and marketing costs.

**Figure 5: Labor invested for garlic production and marketing expressed as hourly wage**

	Farm A	Farm B	Farm C	Farm D	Farm E	Farm F	Farm G	Farm H	Average
<b>Total hours worked</b>	210	293	349	59	144	109	56	297	190
<b>Hourly wage</b>	\$13.16	\$7.18	\$4.29	\$10.05	\$(0.27)	\$9.68	\$13.90	\$5.92	\$6.93

## Financial Scenario Based on One-Tenth Acre Plot

To create an apples-to-apples comparison across all farms, Extension transformed all data reported by farms to a one-tenth acre plot. Presenting data on a per acre basis is typical of farm business management reports. However, since the acreage size for garlic enterprises is so small, data is presented on a tenth acre basis. One tenth of an acre is 4,356 square feet, or approximately a 6 x 720 foot bed. Eight growers spent \$4.85 to produce a pound of garlic. This breakeven price covers all production and marketing costs (cash and non-cash) but not labor costs. Study participants spent on average of 210 hours on one-tenth of an acre, which, if valued at \$10/hour, nearly doubles the breakeven price to \$8.71.

When all farms are at a consistent one-tenth of an acre basis, Farm G and F are most profitable. This may be an unfair comparison, however, since they are the smallest farms in the sample and their production system may not be conducive to scaling up to a tenth of an acre. It is clear that the price at which growers marketed their crop had a large impact on their bottom line, especially since production costs were consistent across five of the seven enterprises. Farm C had high productivity but also high operating costs, whereas Farm E had low costs and low productivity compared to others in the sample.

**Figure 6: Garlic enterprise analysis on one-tenth acre basis (n=8)**

	<i>Farm A</i>	<i>Farm B</i>	<i>Farm C</i>	<i>Farm D</i>	<i>Farm E</i>	<i>Farm F</i>	<i>Farm G</i>	<i>Farm H</i>	<b>Average</b>
<b>Total production (lbs.)</b>	533	556	1,018	438	136	849	445	389	545
Lbs. sold	436	403	938	290	124	610	355	347	438
<b>Garlic sales</b>									
<b>Garlic sales</b>	\$4,592	\$3,433	\$9,462	\$3,215	\$541	\$4,356	\$6,850	\$2,928	\$4,422
Sales per lb. sold	\$10.54	\$8.52	\$10.08	\$11.09	\$4.38	\$7.14	\$19.30	\$8.43	\$10.10
Sales per lb. produced	\$8.62	\$6.17	\$9.30	\$7.35	\$3.98	\$5.13	\$15.39	\$7.53	\$8.11
<b>Operating revenue</b>									
<b>Operating revenue</b>	\$2,360	\$1,051	\$1,661	\$1,483	\$(24)	\$2,828	\$3,892	\$957	\$1,776
Per sq. ft.	\$0.54	\$0.24	\$0.38	\$0.34	\$(0.01)	\$0.65	\$0.89	\$0.22	\$0.41
Per hour worked	\$13.16	\$7.18	\$4.29	\$10.05	\$(0.27)	\$9.68	\$13.90	\$5.92	\$8.45
Gross margin	51%	31%	18%	46%	-4%	65%	57%	33%	40%
									<b>Average</b>
<b>Production Expenses (2016-17 year)</b>	\$1,707	\$2,113	\$6,696	\$1,628	\$418	\$1,439	\$2,165	\$1,744	\$2,239
Mulch					\$40	\$48	\$200	\$121	\$51
Custom hire		\$145							\$18
Fertilizer	\$22	\$54	\$1,129		\$27	\$80	\$100	\$28	\$180
Fuel and oil	\$4	\$25			\$13	\$11			\$7
Hired labor	\$282	\$200						\$299	\$98
Production Supplies	\$13	\$18	\$642		\$47				\$90
Repairs, maintenance			\$649						\$81
Seed purchased	\$287		\$442				\$1,210	\$33	\$246
Value of saved seed saved used for 2017*	\$1,025	\$1,560	\$3,400	\$1,620	\$272	\$1,289	\$600	\$1,006	\$1,347
Electricity	\$68	\$100	\$344	\$5			\$25	\$196	\$112
Machinery cost (calculated):	\$6	\$12	\$89	\$3	\$18	\$11	\$30	\$60	\$31
									<b>Average</b>
<b>Post-harvest/marketing expenses</b>	\$525	\$269	\$1,106	\$105	\$147	\$88	\$793	\$228	\$408
Advertising/marketing	\$73	\$100	\$200	\$19	\$68		\$55	\$109	\$78
Farm Insurance			\$278				\$211		\$61
Hired Labor: Sales	\$85								\$11
Post-harvest packaging and labels	\$29	\$100	\$222	\$10		\$16		\$54	\$54
Phone		\$41		\$3			\$54		\$12
Internet				\$3			\$48		\$6
Marketing supplies (displays, canopy, etc.)	\$128		\$167				\$15		\$39
Mileage (0.545/mile)	\$209	\$28	\$239	\$70	\$80	\$72	\$410	\$64	\$147

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