

The Cost of Production for Vermont Maple Syrup

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Maple is the second largest agricultural sector in Vermont. In 2015 it represented over \$44 Million in cash receipts with 4,490,000 taps producing over 1.39 million gallons of syrup. Vermont producers are also the consistent leaders in maple productivity across the country (USDA NASS, 2015). Innovations in sap collection and sugarhouse efficiency have enabled the rapid expansion of enterprises and the establishment of new maple businesses at larger scales than experienced in previous decades. The maple resource is available with room to grow. Research showed that in 2011 Vermont was using roughly 3% of the state's maple resource on syrup production. Analysis of nine other maple producing states in the same year showed less than 1% utilization of their maple resource for syrup production (Farrell & Chabot, 2012).

Larger scale and higher technology maple businesses balance the opportunity for high yields with the trade-off of higher initial investment costs and new management practices. Many maple enterprises maintain higher fixed costs in the form of loan payments or depreciation under these new management systems. The adoption of reverse osmosis (RO) technology has reduced labor in the sugarhouse but much of that labor has been shifted to the labor required in the woods to manage more taps on vacuum tubing systems. Both depreciation and owner labor are non-cash economic costs that individual producers

and their accountants are not always accustomed to measuring accurately.

The strong and stable bulk maple prices helping fuel US maple expansion for several years are now dipping downwards. Despite public presentations that the US maple production may need to grow at 10% per year to keep pace with market expansion, the current market expansion is occurring at far lower prices. Bulk maple prices for US producers peaked in 2012 near \$2.92 per pound. By 2016 US prices for bulk syrup are being quoted at ~\$2.20 per pound. Previously, most producers were concerned that overproduction would disrupt the price stability resulting from the Federation of Quebec Maple Producers supply management programs (Sherwood, 2014). Instead, current price reductions for the US maple industry are due to US/Canadian currency exchange rates and a stronger US dollar (Perkins, Isslehardt, Van Den Berg, 2015). If the situation persists, high cost enterprises will face cash flow issues and owners will be forced to defer cash draws for salary. Would-be-expansion projects are currently being re-evaluated for their feasibility at different market price forecasts.

The University of Vermont Maple Benchmark project is advancing the study of maple economics and supporting management decision making at the individual business level. The following article summarizes the cost of production findings from 2014

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and synthesizes key trends in business management. The full benchmark results are available online at: <http://blog.uvm.edu/farmvia/>

Methods

Business data was collected from 18 maple producers in Vermont. The initial roster of participants (the study began in 2013) came from a combination of referrals within the industry and recruitment at public events. The participating maple businesses are not necessarily a representative sample of the industry at large. The majority of participants have over 15 years of experience running their maple business, and the cumulative average yield across the study group has been higher than state averages for 2013 and 2014. The small study group, however, provides a detailed look at financial performance merged with observations of the unique business dynamics that influence each enterprise.

Participating businesses shared accounting records, labor records and business information with outreach educators. Cash-based accounting re-

ords were standardized to accrual production-based income formats using standards from the Farm Financial Standards Council (FFSC, 2014). Farm investments were recorded based on purchase price and depreciation was calculated using straight line methods over standardized lifespans typical of maple assets. A primary challenge with financial analysis of any agricultural business is the presence of unpaid owner/family labor and management. For this study unpaid labor was recorded and valued at \$18 per hour. Actual salaries were standardized and adjusted to match industry standards on productivity and managerial responsibilities. The following cost of production (COP) definitions are used to define findings with these methods:

- COP from Operations: Includes variable costs, fixed costs (excluding loans, capital expenses and owner compensation)
- COP with Depreciation: Includes COP from Operations and depreciation. It does not include owner draws or unpaid labor/management.
- Full Economic COP: Includes COP

with Depreciation, owner draws and the value of unpaid labor/management. All unpaid owner labor is tracked and valued at \$18 per hour.

Results

Investment

Purchase price investment for equipment



Figure 1: Average Investment (Purchase Price) in Relation to Production Scale

ranges from \$18 per tap to \$70 per tap. This does not include real estate investments. The average investment for existing businesses is \$45 per tap. The data shows two key trends. First, above average yield producers (over 4.26 lbs syrup per tap) have more invested per tap compared to below average producers. A high yield producer (average investment = \$50 per tap) will have spent \$250,000 on a 5,000 tap set-up compared to a \$190,000 (\$38 per tap) investment for a below average yield enterprise. Second, larger businesses have a lower investment per tap. Figure 1 shows how maple businesses with 15,000 taps and more are spending roughly 40% less on investments than small enterprises.

Cost of Production

Cost analysis shows that each producer’s top cash expenses varied significantly. Wood fired evaporators did not have fuel expenses but incurred increased owner labor expenses for fuelwood preparation. Purchased syrup is a significant expense for enterprises that repack products for retail sales. Newly established sugar woods have low repairs and maintenance expenses in the first 3 years. Many enterprises show large expenses for “supplies” but the application of uniform capitalization rules often reveals that tap expansion projects (hardware and pipeline) should be removed from “supplies,” capitalized, and depreciated over multiple years.

Non-cash or economic costs are significant for maple enterprises. Economic valuation techniques were used to measure the value of unpaid owner labor in the absence of cash payments. The largest expense category across all participants are the combined total of paid hired labor, unpaid owner labor and owner salaries. These three labor charges combine to average ~26% of gross sales for the study group. The next largest expense is depreciation. Depreciation accounts for an average of 20% of gross sales for the study group. In short, a family operated maple business (with no payroll expenses) could be in a situation where approximately 46% of gross sales are attributed to non-cash expenses. The direct result is that many producers are retaining large amounts of surplus cash with the discretion to apply this cash to owner payments, capital improvements/expansions, or to retain a cash reserve.

Cost of production (COP) was measured at three levels. In 2014 average “COP for Operations” is \$9.15 per tap and \$2.09 per pound. “COP with Depreciation” uses COP from Operations and adds the economic cost of aging assets. “COP with depreciation” is \$12.04 per tap and \$2.72 per pound. The Full Economic COP adds a value for unpaid owner labor and management to the cost profile. In 2014 the benchmark group demonstrated Full Economic COP of \$15.71 per tap or \$3.65 per pound. See Table 1 and Table 2.

Cost of production is lowest for the

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	Range			
	Low	High	Average	Median
COP (Operations) Per Tap	\$ 3.07	\$ 19.27	\$ 9.15	\$ 6.95
COP (Operations) Per Gallon	\$ 6.35	\$ 61.71	\$ 23.25	\$ 20.00
COP (Operations) Per Pound	\$ 0.57	\$ 5.53	\$ 2.09	\$ 1.79

Table 1: Operating cost of production

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largest scale enterprises studied. This study did observe a small number of smaller enterprises selling to bulk markets that have a low cost of production (under \$2.50 per pound). It is possible to establish an efficient low cost enterprise less than 5,000 taps. Other participating businesses under 5,000 taps have very high cost of production due to a large amount of owner labor required to direct market syrup. Figure 2 shows the relationship between business scale and cost of production. The majority of producers from 5,000 – 14,999 taps have a mixed market strategy. These producers sell to a mix of bulk, wholesale, and retail accounts in order to generate an average pay price that covers their cost of production.

The study found maple businesses realizing profits and losses at all scales, from 2,500 taps to over 15,000 taps.

Discussion

Bulk producers indicate they can tolerate a short term situation of prices around \$2.20 per pound. Many managers are uncomfortable with the prospect of sustained prices near \$2.00 per pound. At the same time, direct marketers and direct wholesalers are saying that their prices have not shifted down as drastically yet. They anticipate downward pressure on these prices over time but they note that there is a lag time for retail price adjustments

that works in their favor in the short term.

Scale and Right-Sizing

For many agricultural sectors there are sweet-spots where businesses thrive and also “no-man’s-land” where a business can get stuck. Maple is the same. It appears that there is a sweet spot for part-time enterprises from 3,000-5,000 taps. Owners can handle the seasonal surge of labor and management and earn reasonable compensation for this part time venture. This “stage-1” maple business may decide to direct market or wholesale a portion of the crop to increase overall sales, but only as long as the time associated with sales does not interfere with the owner’s “day-job.” Technology advancements allow for managers to handle ~ 4,000 taps with limited hired labor and modest marketing efforts.

Findings indicate that a “no-mans-land” might exist as these enterprises increase past 5,000 taps. It is not clear exactly where the next sweet spot for a “stage-2” business develops between 8,000 and 15,000 taps. Maple businesses scaled from 5,000 - 8,499 taps do not demonstrate a cost of production advantage over smaller or larger enterprises. Owner labor/management, hired labor and new investments are big factors that influence performance at this scale. A “stage-2” 10,000 tap enterprise has a new inventory of equip-

	Range		Average	Median
	Low	High		
Full Economic Cost of Production (COP) Per Tap	\$ 9.30	\$ 24.95	\$ 15.71	\$ 14.50
Full Economic Cost of Production (COP) Per Gallon	\$ 17.19	\$ 92.40	\$ 40.75	\$ 35.59
Full Economic Cost of Production (COP) Per Pound	\$ 1.54	\$ 8.29	\$ 3.65	\$ 3.19

Table 2: Full economic cost of production

ment (expanded from the 5,000 tap scale) and there is enough syrup flowing through the draw-off to payback the investment. This next scale requires more management and labor but these operators are often streamlining owner labor by transitioning to bulk sales. Many 10,000+ tap enterprises are managed by owners that still have other farm/forest businesses or off-farm jobs for most of the year.

Stage-3 maple businesses emerge near 20,000 taps. At average yields and bulk prices (4.4 lbs. syrup per tap x \$2.40 per lb.) the annual gross sales will total approximately \$200,000. Across all agriculture the \$200,000 level is a place where owners can participate full-time and retain a salary from business income. Stage-3 maple owners also have enough work laid out to hire a full-time employee or multiple seasonal employees to manage everything from pipeline repairs to new marketing activities.

It is presumptuous to suggest a “right-size” for any particular business. Maple managers must observe and adjust based on their particular situation. The solution might even be to downsize production or shift to alternative markets. Adding 500 -1,000 taps at a time will not always lead to better economic outcomes. The jump to the next sweet-spot may require a larger investment or marketing shift than previously anticipated, and it may yield better returns.

References

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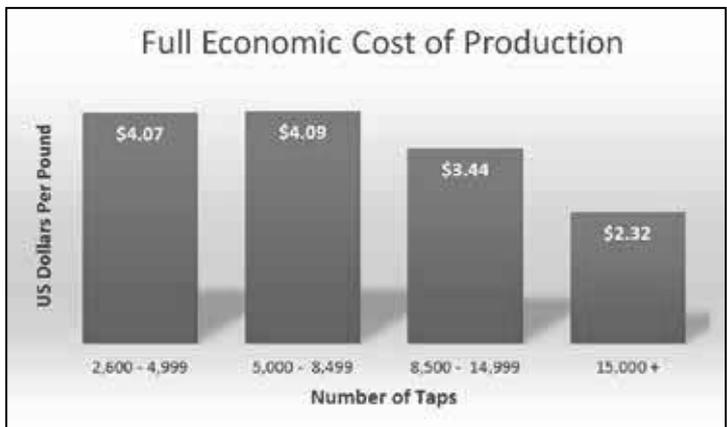


Figure 2: Full Economic Cost of Production in Relation to Production Scale