



Beekeeping-Honey Harvest Methods, Costs and Breakeven Calculations

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Introduction

This fact sheet provides information regarding the production and pricing of honey. Its purpose is to aid beekeepers in the harvesting process, budgeting, and marketing of honey. Costs associated with production may vary by location, and breakeven prices may exceed what consumers are willing to pay. This fact sheet is to serve as an information guide, and includes an interactive excel sheet located [here](#). Information regarding the startup costs associated with beekeeping can be found in fact sheet [AGEC-2002](#). To calculate startup costs needed for the attached budget, you will need to complete the interactive excel sheet from fact sheet AGE-2002 found [here](#).

It is important to note that this fact sheet, as well as AGE-2002 gives a one hive example. It is highly recommended to start a beekeeping operation with at least two hives. This is true for even backyard beekeepers. Two hives allows for the transfer of resources between hives, and provides a comparison to evaluate the strength of your hives throughout the season. These fact sheets and excel tools can easily be scaled up to evaluate many hives. It is unlikely a beekeeper will be profitable from one hive. Many fixed costs such as suits and extractors can be spread across several hives, making a multi hive operation more profitable.

Harvesting Honey

The first step in harvesting honey is determining when and how much to harvest. Within the first year of establishing your beehive, you are unlikely to collect a significant amount of surplus honey. Surplus honey refers to the honey you are able to take from the hive for your use. Your bees need time to forage and build their population. Therefore, you may not harvest any honey your first year.

In order to keep your hive thriving, some of the honey your bees produce will need to remain in the hive for their own use during winter when there is no pollen/nectar. In climates with colder weather, the recommendation is to leave approximately 60 to 70 pounds of honey per hive. In climates with little to no cold season, it is recommended to leave 20 to 30 pounds. Estimating the pounds of honey in your hive will depend on frame size, with Langstroth deep frames estimated to yield six pounds of honey, medium frames yielding four pounds, and shallow frames estimated to yield three pounds of honey per frame. For better accuracy, you can weigh frames with a

portable scale. Determining when to harvest honey can vary depending on the climate and nectar flow within your area. A frame can be harvested when 80 percent or more has been filled with wax-capped honey.

Once the frames have been filled with honey, capped, and the nectar flow season has completed, you can begin the process of extracting liquid honey. Nectar flow refers to the period when abundant nectar is available for bees to collect, and can vary greatly by local conditions. Harvesting wax-capped cells ensures the moisture content is correct within your honey. Harvesting honey before capping can result in fermentation and spoiling; however, in some cases you can harvest open celled honey. Including open cell honey in your harvest requires close monitoring of the honey moisture content. Checking the moisture content can be done in the following manner. Lift the frame you plan to harvest and give it a gentle shake. If honey leaks from the cells, it is not cured, and you should not harvest that frame. These leaking cells have excess water content, meaning they are still considered nectar and will spoil if harvested. Equipment is also available to measure the true moisture content of honey. Honey refractometers can be easily purchased online, or from beekeeping stores. The moisture content should be between 17-21%.

Manual or Electric Extractor Method

There are many methods for extracting honey. While doing so safety is important. Be sure to wear a beekeeping suit. Options for protection are discussed in fact sheet [AGEC-2002](#). First, you will need to remove the frames from the hive. You can use smoke to calm the bees and gently shake and brush them from the frame. If you find this method difficult, another option is to use bee escape boards or repellent to lure the bees out.

Once you have removed the frames you will be extracting honey from, you will need to uncapping the honey with an uncapping knife. Electric uncapping knives are widely used to get a precise cut; however, a cold serrated uncapping knife dipped in hot water can be used as an affordable option. Starting a quarter way from the frame bottom, using a side-to-side slicing motion, slice upward to expose the cells of honey. Using a downward slice, cut the bottom quarter off the frame and flip the frame over. Next, remove the capped wax from the opposite side using the same technique. Finish by uncapping

any missed cells with an uncapping scratcher.

Place uncapped frames vertically in your honey extractor. Extractors come in numerous styles, sizes, and price ranges. Motorized extractors make the process less labor intensive; however, manually spun extractors are an affordable option. Once you have placed the uncapped frames in the extractor and put the cover in place, begin to slowly spin the frames and gradually increase speed. Spin for 10 to 12 minutes flipping the frame to the opposite side at the halfway point.

Once the extractor is filled with honey, drain into a bottling bucket through a sieve or fine kitchen strainer. This step ensures your honey is free of wax or other contaminations before bottling. After straining, allow the honey to rest for an hour in the bottling bucket to let air bubbles rise to the top before bottling.

Crush and Strain Method

If you do not have a manual or electric extractor, you may consider the “crush and strain method”. This method is best suited for harvesting smaller amounts of honey. To harvest honey using this method, you will need two food grade plastic buckets, a potato masher, a honey strainer, and a long-serrated knife.

First you will need to drill multiple holes into the bottom of one of your plastic buckets. Place the bucket with holes on top of a bucket with a honey strainer in between the two buckets. Holding your frame over the bucket, cut the honeycomb off the frame into the bucket. Using a potato smasher, repeatedly crush the comb, allowing the honey to drain from the cells. Once you have mashed the honeycomb until all the cells have ruptured, allow the honey to drain from the holed bucket through the strainer into the bottom bucket. After letting the honey drain overnight, you may use the bottom bucket filled with honey to fill bottles. Although this method is lower cost, the process results in comb damage. Many beekeepers will reuse comb to help increase production for future years. It takes many pounds of honey consumed by the bees to build one pound of comb. If you plan on selling, or using your wax to make products, the destruction of the comb may not be an issue. Choose a harvesting method that fits with your long-term goals, current product mix, and financial resources.

Bottling

After resting, honey is ready to be bottled. Bottling options range from glass jars to plastic bottles. Containers must be sanitized and airtight to prevent bacteria. Run your containers through a hot cycle in your dishwasher and allow them to completely dry before filling them. Glass jars can be placed in your oven on low (230 F) for 15 to 20 minutes in order speed up the drying process.

It is important to note that honey production can change from year-to-year. Honey production is dependent on your management strategies, the health of the hive, and uncontrollable factors like drought.

Product Labeling and Liability

Prior to starting a bee enterprise, it is important to assess your state and local ordinances. The Oklahoma Apiary Act (2005) prohibits Oklahoma county, municipal, corporation, consolidated government, or other political subdivisions from

banning bee enterprises within city limits, allowing for urban production. To sell your honey in compliance with Oklahoma law, your enterprise must fulfill the following requirements: you produced less than 500 gallons of honey within the year, your hives are located within the state of Oklahoma, and your honey is raw and has not been altered with other products. In order to sell bottled honey, your containers must have a common food product name, the net weight of honey, the beekeeper’s name, your ten-digit phone number, the address of where it was produced, and the statement “Bottled or packaged in a facility not inspected by the Oklahoma Department of Health.”

It is important to consider the liability you face when selling your products, particularly at Farmer’s Markets. Farmer’s Market insurance is a way to combat legal repercussions and protect personal property. There are numerous options for insurance plans that can be found by calling local insurance companies or doing a search online. You should find an insurance plan that best suits the annual income of your enterprise as well as the coverage you may need. This analysis used Flip’s Farmer’s market insurance as an example coverage plan. At an estimated cost of \$300 a year, this plan provides general liability of up to \$2,000,000 in product liability, one million dollars in personal and advertising injury, \$300,000 in damages to rented premises, \$300,000 in workers compensation, and \$5,000 in business personal property.

Marketing

Once you have completed the harvesting process and have filled your correctly labeled containers, your honey is ready to sell. To begin, you can use word of mouth. Tell your friends, neighbors, and coworkers about your enterprise. You can attend and sell your products at Farmer’s Markets. Farmer’s Markets give you a great opportunity to interact face-to-face with customers and explain the unique process behind your products. Many farmer’s markets have associated costs, and require pre-registration. For more information about farmer’s markets visit [FAPC-184](#).

Social media pages are another way to reach potential customers. Not only can you create interest by documenting and informing customers about your bees, but they will also have an easy way to contact you about your products. As your production begins to grow, creating a website where customers can place orders may allow you to expand your customer base outside of your local area.

Excel Sheet

The companion [excel sheet](#) to this fact sheet includes an example analysis of two different scenarios. The first scenario is producing eight-ounce containers of honey and the other is producing one-pound containers. For these scenarios, it is assumed the wax harvested will be reused within the operation.

8 oz Honey Enterprise Budget Tab

First, the total startup cost of your bee enterprise must be calculated. This can be estimated by filling out the beginning beekeeping budget found in OSU factsheet [AGEC-2002](#). If you do not put your costs under *Your Number*, the example number will be used for further calculations (Figure 1).

Figure 1. Start up costs

For the example, it was assumed a 10-frame medium Langstroth box was harvested, totaling 40lbs of honey (Figure 2).

Example Values		
	Frames Harvested	lbs Honey Harvested
Langstroth deep frame	0	0
Langstroth medium frame	10	40
Langstroth shallow frame	0	0
Example Total		40

Figure 2. Amount of honey harvested

You will need to type the number of frames of each type (deep, medium or shallow) you are harvesting. The projected lbs harvested will give you an estimated harvest based on the number and type of frames indicated (Figure 3). Alternatively, you can type the lbs of honey harvested under the heading *lbs Honey Harvested*. The total lbs you harvested will appear under *Your Total lbs*. If you do not provide your number of pounds under the *lbs Honey Harvested* column, the projected numbers will be used in further calculations.

Your Values			
	Frames Harvested	Projected lbs harvested	lbs Honey Harvested
Langstroth deep frame		0	
Langstroth medium frame		0	
Langstroth shallow frame		0	
Total		0	0

Example Total lbs 40 Your

Figure 3. Amount of honey harvested and totals.

For the example, fixed costs and average prices from several beekeeping supply and farm stores were used (Figure 4).

Fixed Costs		Example Values		
	Example number	units	Example Prices	
Extractor	1	units	254	\$
Uncapping Knife	1	units	75	\$
Uncapping Scratcher	1	units	7	\$
Strainer	1	units	34	\$
Bottling Bucket	1	units	25	\$
Other	0	units	0	\$

Figure 4. Example equipment

For *Your Values* give the unit cost and number of units purchased for the listed equipment (Figure 5). Depending on the harvesting method you use, not all of the listed equipment will be needed. The *Your Total Cost* column automatically multiplies the number and price for each piece of equipment. The example *Fixed Cost* and *Your Fixed Cost* will appear under the appropriate headers.

Fixed Costs		Your Values		Your total cost	
	Your number	Your price per unit			
Extractor			\$/unit	0	\$/unit
Uncapping Knife			\$/unit	0	\$/unit
Uncapping Scratcher			\$/unit	0	\$/unit
Strainer			\$/unit	0	\$/unit
Bottling Bucket			\$/unit	0	\$/unit
Other			\$/unit	0	\$/unit
Example Fixed Cost				Your Fix	
				\$ 1,079.20	\$

Figure 5. Equipment and totals

For the example variable costs, honey harvesting labor was assumed at 15 hours and management labor was assumed at 3.5 hours (Figure 6). All labor cost was assumed to be minimum wage. Based on the average dishwashing cycle, it was assumed four gallons of water would be needed for sanitizing containers.

Variable Costs		Example Values		
	Example number		Example Prices	
Harvesting Labor	15	hours	7.25	\$/hr
Management Labor	3.5	hours	7.25	\$/hr
8oz Containers	120	containers	1.5	\$/unit
Water	4	gallons	0.0015	\$/gal

Figure 6. Example variable costs

For *Your Values* you may want to assign your labor a value greater than minimum wage to better reflect the value of your time. Additionally, more or less labor hours may be needed depending on experience level and amount harvested. Again, the *Your Total Cost* column automatically multiplies the number and price for each variable cost. For both the *Example* and *Your Values*, the total variable costs are automatically calculated. You will need to input the total bottles produced. This is likely the pounds of honey harvested multiplied by two. However, there may be some product loss, so the actual number will need to be entered (Figure 7). The variable cost per 8 oz. bottle will be automatically calculated. This is an important number because you should not operate if all variable costs are not covered, and have at least some revenue to begin to cover fixed costs.

Variable Costs		Your Values		Your total cost	
	Your Number	Your price per unit			
Harvesting Labor		hours	\$/hr	0	\$/unit
Management Labor		hours	\$/hr	0	\$/unit
8oz Containers		containers	\$/unit	0	\$/unit
Water		gallons	\$/gal	0	\$/unit
Total Variable Cost				Example	Your Values
				\$314.13	\$0.00
				Bottles produced 80.00	
				Variable Cost per 8oz bottle: \$3.93	

Figure 7. Variable costs and totals

Toward the bottom of the excel sheet are the *Total Fixed Cost*, *Total Variable Cost*, and *Total Cost* (Figure 8). All of these values will be calculated for you. To calculate the *Annual Ownership Cost*, depreciation was calculated using the straight-line method with an ending salvage value in year five of zero dollars. This is a conservative assumption; with good hive care, equipment should last beyond five years. Note, depreciation is a way of spreading the fixed (sunk) costs over a period of time, hence recovery of those fixed cost is spread over those years of depreciation. Interest, or the opportunity cost of investing your money elsewhere, was assumed at ten percent for the example. You can put your own interest rate under the *Your Values* column. Repairs were assumed at five percent per year. Due to beekeeping's tax exempt status, no taxes were included. Insurance was based on Flip's Farmer's market plan and was estimated at \$300 per year. Under the *Your Values* column, you can put your insurance cost. The breakeven cost of honey is calculated for you, using the equation:

$$\text{Single Product BreakEven Price} = \frac{\text{Annual Ownership Cost} + \text{Variable Cost}}{\text{Bottles Produced}}$$

	Example	Your Values
8oz Bottles of Honey Produced	80	0
Total Fixed Cost	\$1,079.20	\$684.20
Total Variable Cost	\$314.13	\$0.00
Total Cost	\$1,393.33	\$684.20

Annual Ownership Cost (AOC)	Example	Your Values
Interest rate	10%	
Depreciaton	\$215.84	\$136.84
Interest	\$53.96	\$0.00
Repairs	\$53.96	\$34.21
Taxes	\$0.00	\$0.00
Insurance	\$300.00	
Total AOC Cost	\$623.76	\$171.05

	Example	Your Value
Breakeven Price of Honey using AOC	\$11.72	-

Figure 8. Totals, AOC, and breakeven price

Under the *Revenue/Profit Calculation* section of the excel sheet you will need to add the sale price for your 8 oz. bottles of honey (Figure 9). Next give the number of bottles sold under *Units Sold*. The *Total Revenue*, *Profit with Total Fixed Costs* and *Profit Accounting for Annual Ownership Costs* will be calculated for you.

Revenue / Profit Calculations			
8oz Honey	Revenue per unit	Units Sold	Total Revenue
			0
Total Revenue	\$	-	
Profit with total fixed costs	\$	(684.20)	
Profit accounting for annual ownership costs	\$	(171.05)	

Figure 9. Revenue/profit calculations

Conclusion

Careful planning can help you determine if a particular enterprise is right for your operation. One of the biggest challenges in beekeeping is the variability of honey production. It is also important to note that in our example we are considering one hive. It is highly recommended to have at least two beehives in order to balance resources between them. The excel tools are set up to be flexible enough to scale up from the one hive example to multiple hives.

References

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