FARM BUSINESS MANAGEMENT

farmdoc

Sample Costs and Returns for a Migratory Commercial Beekeeping Operation 2025-2026



Pollination Services - Honey Production

8,500 Colony Operation

North Dakota

College of Agricultural, Consumer & Environmental Sciences

UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

Introduction

Brittney Goodrich and Allison Altschuler
Department of Agricultural and Consumer Economics
Updated Version-November 2026

This publication presents detailed sample costs and returns for a representative commercial migratory beekeeping operation based in North Dakota that transports colonies to California and Texas for seasonal colony management. This analysis does not represent any single operation and is intended as a guide only. Assumptions for the representative operation were developed using information provided by beekeeper cooperators and other industry representatives, as well as from established literature and existing beekeeping enterprise budgets. Cost estimates reflect 2025–2026 production conditions and include variable inputs, hired labor, transportation, capital recovery on equipment and infrastructure, and both cash and noncash overhead. The mention of trade names or commercial products in this analysis does not imply endorsement or recommendation by the University of Illinois.

1. Costs and Returns Tables 3
Table 1. Costs and Returns for a Representative Migratory Commercial Beekeeping Operation 3
Table 2. Equipment, Investment, and Business Overhead Costs for a Representative Migratory Commercial Beekeeping Operation 5
Table 3. Sensitivity of Net Returns to Almond Pollination Fees ($/Colony) and Colonies Rented Out as a Percentage of January Population 7
Table 4. Sensitivity of Net Returns to Honey Prices ($/lb) and Yield (lbs/colony) 8
2. Overview of the Representative Operation 9
3. Production Practices and Colony Management 10
4. Labor 13
5. Transportation and Vehicles 14
6. Operating Interest 15
7. Equipment and Buildings 15
8. Cash Overhead 16
9. Non-cash Overhead 17
10. Revenue 18
11. References 19

Acknowledgments:
The overall farm enterprise approach is from the UC Davis Farm Cost and Returns Studies, coststudies.ucdavis.edu/. The budgeting methodology and spreadsheet structure used in this study were adapted from an unpublished commercial beekeeping costs and returns study developed by Champetier et al. (2018). The original study examined a 1,000-colony pollination and honey-production operation in California, whereas the present analysis updates assumptions, prices, and management practices to represent an 8,500-colony migratory beekeeping operation based in North Dakota. We gratefully acknowledge the authors of the UC Davis study for sharing the original spreadsheet model and draft manuscript.

References:

Champetier, A., Fafard, A., Stewart, D., and Sumner, D. A. 2018. Sample Costs of Commercial Beekeeping: Pollination Service and Honey Production, Central California. Unpublished draft manuscript. Agricultural Issues Center, University of California, Davis.

Champetier, A. and Sumner, D.A. (2019), Marginal Costs and Likely Supply Elasticities for Pollination and Honey. American Journal of Agricultural Economics, 101: 1373-1385. https://doi.org/10.1093/ajae/aaz045

This work was supported by the Specialty Crop Research Initiative, project award no. 2023-51181-41246, from the U.S. Department of Agriculture's National Institute of Food and Agriculture. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and should not be construed to represent any official USDA or U.S. Government determination or policy.

1. Costs and Returns Tables

Table 1. Costs and Returns for a Representative Migratory Commercial Beekeeping Operation

REVENUES						
Pollination	Hives rented	Price ($/unit)	Unit	Yearly Total	Total Per Hive*	
Almond	5000	$ 195	Colony	$ 975,000	$ 114.71	
Crop #2	0	$ -	Colony	$ -	$ -	
Crop #3	0	$ -	Colony	$ -	$ -	
Total pollination				**$ 975,000**	**$ 114.71**	
Apiary products	Production (lbs)	Price ($/unit)	Unit			
Honey	546,000	$ 1.90	lbs	$ 1,037,400	$ 122.05	
Less: Honey Yard Rent	7,020	$ 1.90	lbs	$ (13,338)	$ (1.57)	
Wax	10,920	$ 3.50	lbs	$ 38,220	$ 4.50	
Total apiary products				**$ 1,062,282**	**$ 124.97**	
Government Programs		Price ($/unit)	Unit			
ELAP		$ 130.00	colony	$ 319,902	$ 37.64	
Other government program #2		$ -				
Other government program #3		$ -				
Total program payments				**$ 319,902**	**$ 37.64**	
TOTAL REVENUES				**$ 2,357,184**	**$ 277.32**	
OPERATING COSTS						
Feed	Hives treated	Price ($/unit)	Unit	Units/hive	Yearly Total	
Protein patties	6,709	$ 1.90	lbs	5	$ 63,735	$ 7.50
Sugar syrup	6,709	$ 4.00	gal	9	$ 241,522	$ 28.41
Total Feed					**$ 305,256**	**$ 35.91**
Varroa Treatment	Hives treated	Price ($/unit)	Unit	Units/hive/year		
Amitraz (Apivar)	6,709	$ 2.17	strips	8	$ 116,243	$ 13.68
Oxalic Acid (VarroxSan)	8,500	$ 2.00	strips	8	$ 135,966	$ 16.00
Formic Acid (Formic Pro)	5,036	$ 2.70	strips	2	$ 27,194	$ 3.20
Total Varroa Treatment					**$ 279,403**	**$ 32.87**
Bees	Hives treated	Price ($/unit)	Unit			
Queen Cells	8,523	$ 6.00	Queen cell		$ 51,139	$ 6.02
Mated Queens	2,131	$ 30.00	Mated queen		$ 63,924	$ 7.52
Packages	0	$ 90	Package		$ -	$ -
Nucs	0	$ 109	Nuc		$ -	$ -
Total Purchased Bees					**$ 115,063**	**$ 13.54**
Labor (operator not included)	Employees	Price ($/unit)	Unit			
Full time Salaried Labor	3	$ 101,530.00	employee		$ 304,590	$ 35.83
Hourly Paid H-2A Labor	8	$ 30,114.72	employee		$ 240,918	$ 28.34
Total Labor					**$ 545,508**	**$ 64.18**
Other Costs	Total Units	Price ($/unit)	Unit			
Drums for honey (55 gallons, 64(	853	$ 34	drums		$ 29,424	$ 3.46
Personnel Transport (Fuel, oil an	80,000	$ 0.70	miles		$ 56,000	$ 6.59
Hive Transport (Contracted)	79,907	$ 4.50	miles		$ 359,581	$ 42.30
Forklift (Fuel, oil and lube)	960	$ 4.00	hours usec		$ 3,840	$ 0.45
Total Other					**$ 448,845**	**$ 52.81**
TOTAL OPERATING COSTS (before interest)					**$ 1,694,076**	**$ 199.30**
Interest on Operating Capital @ 9%					$ 396	$ 0.05
TOTAL OPERATING COSTS (after interest)					**$ 1,694,471**	**$ 199.35**
NET RETURNS ABOVE OPERATING COSTS					**$ 662,712**	**$ 77.97**

Table 1 continued next page.

Table 1 Continued. Costs and Returns for a Representative Migratory Commercial Beekeeping Operation

CASH OVERHEAD COSTS	Yearly Total	Total Per Hive*
Office/Shop/Warehouse Utilities	$ 70,400	$ 8.28
Annual Capital Repair Total	$ 151,682	$ 17.84
Holding yards	$ 7,000	$ 0.82
Property and Liability Insurance	$ 24,000	$ 2.82
Property Taxes	$ 39,600	$ 4.66
H-2A (Living expenses, travel, etc.)	$ 109,600	$ 12.89
TOTAL CASH OVERHEAD COSTS	**$ 402,282**	**$ 47.33**
TOTAL CASH COSTS	**$ 2,096,754**	**$ 246.68**
NET RETURNS ABOVE CASH COSTS	**$ 260,430**	**$ 30.64**
TOTAL NON-CASH OVERHEAD COSTS (ANNUAL CAPITAL RECOVERY)	**$ 783,733**	**$ 92.20**
TOTAL COSTS	**$ 2,880,487**	**$ 338.88**
NET RETURNS ABOVE TOTAL COSTS	**$ (523,304)**	**$ -61.57**

*Total per hive calculated using the maximum number of hives per year

Table 2. Equipment, Investment, and Business Overhead Costs for a Representative Migratory Commercial Beekeeping Operation

Hive equipment	Total units for operation	Price/unit purchase	Capital Investment	Annual Capital Recovery*
Brood boxes				
deep boxes (9-5/8")	17000	$ 17.95	$ 305,150	$ 21,718
deep frames (9-5/8")	170000	$ 1.30	$ 221,000	$ 33,430
deep foundation (9-5/8")	170000	$ 1.60	$ 272,000	$ 41,144
Honey Supers (for honey producing colonies only)				$ -
medium depth boxes (6-5/8")	23400	$ 8.00	$ 187,200	$ 13,323
medium depth frames (6-5/8")	234000	$ 0.40	$ 93,600	$ 14,158
medium depth foundation (6-5/8")	234000	$ 0.04	$ 9,360	$ 1,416
Other parts				$ -
Bottom boards	8500	$ 8	$ 68,000	$ 4,840
Covers	8500	$ 8	$ 68,000	$ 4,840
Queen excluders	17000	$ 9	$ 153,000	$ 10,889
Fume boards	85	$ 9	$ 765	$ 54
Gallons paint	128	$ 16	$ 2,040	$ 309
Feeders	8500	$ 7	$ 59,500	$ 4,235
Pallets	2125	$ 15	$ 31,875	$ 4,822
Sub-Total			**$ 1,471,490**	**$ 155,177**
Live bees				
Initial colony stock	8500	$ 90.00	$ 765,000	$ 63,113
Sub-Total			**$ 765,000**	**$ 63,113**
Field equipment				
Smokers	25	$ 47	$ 1,186	$ 107
Veils	25	$ 48	$ 1,198	$ 181
Hive tools	50	$ 7	$ 350	$ 32
Bee Blower	5	$ 300	$ 1,500	$ 227
Suit	10	$ 134	$ 1,340	$ 203
Vaporizer	**0**	**$ 137**	$ -	$ -
12 V battery	**0**	**$ 66**	$ -	$ -
Respiratory Protection	**0**	**70**	$ -	$ -
Sub-Total			**$ 5,574**	**$ 750**
Warehouse equipment				
1 power saw and jointer	1	$ 453	$ 272	$ 32
1 arc welder	1	$ 225	$ 135	$ 16
Platform scales	2	$ 74	$ 89	$ 11
Power drill 1/2"	2	$ 200	$ 240	$ 61
Power sander	1	$ 194	$ 116	$ 29
Paint sprayer	1	$ 225	$ 135	$ 34
Miscellaneous equipment	1	$ 1,000	$ 600	$ 151
Sub-Total			**$ 1,587**	**$ 334**

Table 2 continued next page.

Table 2. Equipment, Investment, and Business Overhead Costs for a Representative Migratory Commercial Beekeeping Operation

Honey extraction equipment							
60 Frame Extractor w/ Air Assist	1	$	70,000	$	42,000	$	4,679
Uncapper	1	$	22,600	$	13,560	$	1,511
Deboxer	1	$	10,000	$	6,000	$	668
Hot Water Supply	1	$	2,100	$	1,260	$	140
Wax Collection System	1	$	11,200	$	6,720	$	749
3" Progressive Cavity Pump	1	$	14,800	$	8,880	$	989
2" Gear Pump	1	$	12,000	$	7,200	$	802
Overhead Empty Box Return	1	$	8,000	$	4,800	$	535
Wax Trap	1	$	45,000	$	27,000	$	3,008
Micellanous equipment	0	$	-	$	-	$	-
Sub-Total				**$**	**117,420**	**$**	**13,080**
Transportation							
2025 FREIGHTLINER 114SD- 53 ft	2	$	276,000	$	331,200	$	32,956
Hummerbee | Classic	4	$	60,000	$	144,000	$	14,329
GVWR, 17 foot bed	4	$	80,000	$	192,000	$	19,105
2025 Ram Big Horn 1500	2	$	40,000	$	48,000	$	4,776
Sub-Total				**$**	**715,200**	**$**	**71,165**
Buildings							
North Dakota							
Honey Extraction Facility	1	$	1,200,000	$	1,200,000	$	109,117
Office/shop	1	$	1,080,000	$	1,080,000	$	98,205
Warehouse	1	$	1,500,000	$	1,500,000	$	136,396
Texas						$	-
Office/Shop/Warehouse	1	$	1,500,000	$	1,500,000	$	136,396
Sub-Total				**$**	**5,280,000**	**$**	**480,115**
TOTAL CAPITAL INVESTMENT				**$**	**8,356,271**	**$**	**783,733**

*60% of cost used to reflect a mix of new and used equipment

Table 3. Sensitivity of Net Returns to Almond Pollination Fees ($/Colony) and Colonies Rented Out as a Percentage of January Population

Net Returns Above Operating Costs

	Percentage of January colonies that can be rented out for almond pollination					
	25%	40%	55%	70%	85%	99%
	Number of colonies rented out for almond pollination					
Pollination Fee ($/colony)	1259	2014	2770	3525	4281	5000
165	(225,000)	(85,989)	67,623	221,070	374,682	512,712
180	(206,115)	(55,779)	109,173	273,945	438,897	587,712
195	(187,230)	(25,569)	150,723	326,820	503,112	662,712
210	(168,345)	4,641	192,273	379,695	567,327	737,712
235	(136,870)	54,991	261,523	467,820	674,352	862,712

Net Returns Above Cash Costs

	Percentage of January colonies that can be rented out for almond pollination					
	25%	40%	55%	70%	85%	99%
	Number of colonies rented out for almond pollination					
Pollination Fee ($/colony)	1259	2014	2770	3525	4281	5000
165	(627,283)	(488,272)	(334,660)	(181,213)	(27,601)	110,430
180	(608,398)	(458,062)	(293,110)	(128,338)	36,614	185,430
195	(589,513)	(427,852)	(251,560)	(75,463)	100,829	260,430
210	(570,628)	(397,642)	(210,010)	(22,588)	165,044	335,430
235	(539,153)	(347,292)	(140,760)	65,537	272,069	460,430

Net Returns Above Total Costs

	Percentage of January colonies that can be rented out for almond pollination					
	25%	40%	55%	70%	85%	99%
	Number of colonies rented out for almond pollination					
Pollination Fee ($/colony)	1259	2014	2770	3525	4281	5000
165	(1,411,016)	(1,272,005)	(1,118,393)	(964,946)	(811,334)	(673,304)
180	(1,392,131)	(1,241,795)	(1,076,843)	(912,071)	(747,119)	(598,304)
195	(1,373,246)	(1,211,585)	(1,035,293)	(859,196)	(682,904)	(523,304)
210	(1,354,361)	(1,181,375)	(993,743)	(806,321)	(618,689)	(448,304)
235	(1,322,886)	(1,131,025)	(924,493)	(718,196)	(511,664)	(323,304)

Note: The net returns factor in decreased shipping costs when fewer colonies are rented out for almond pollination.

Table 4. Sensitivity of Net Returns to Honey Prices ($/lb) and Yield (lbs/colony)

Net Returns Above Operating Costs

	Honey Yield (lbs/colony)					
Honey Price ($/lb)	25	40	55	70	85	100
1.50	(103,950)	79,740	263,430	447,120	630,810	814,500
1.70	(66,354)	140,736	347,826	554,916	762,006	969,096
1.90	(28,758)	201,732	432,222	662,712	893,202	1,123,692
2.10	8,838	262,728	516,618	770,508	1,024,398	1,278,288
2.30	46,434	323,724	601,014	878,304	1,155,594	1,432,884
2.50	84,030	384,720	685,410	986,100	1,286,790	1,587,480

Net Returns Above Cash Costs

	Honey Yield (lbs/colony)					
Honey Price ($/lb)	25	40	55	70	85	100
1.50	(506,232)	(322,542)	(138,852)	44,838	228,528	412,218
1.70	(468,636)	(261,546)	(54,456)	152,634	359,724	566,814
1.90	(431,040)	(200,550)	29,940	260,430	490,920	721,410
2.10	(393,444)	(139,554)	114,336	368,226	622,116	876,006
2.30	(355,848)	(78,558)	198,732	476,022	753,312	1,030,602
2.50	(318,252)	(17,562)	283,128	583,818	884,508	1,185,198

Net Returns Above Total Costs

	Honey Yield (lbs/colony)					
Honey Price ($/lb)	25	40	55	70	85	100
1.50	(1,289,966)	(1,106,276)	(922,586)	(738,896)	(555,206)	(371,516)
1.70	(1,252,370)	(1,045,280)	(838,190)	(631,100)	(424,010)	(216,920)
1.90	(1,214,774)	(984,284)	(753,794)	(523,304)	(292,814)	(62,324)
2.10	(1,177,178)	(923,288)	(669,398)	(415,508)	(161,618)	92,272
2.30	(1,139,582)	(862,292)	(585,002)	(307,712)	(30,422)	246,868
2.50	(1,101,986)	(801,296)	(500,606)	(199,916)	100,774	401,464

Note: The net returns factor in changes in wax production when honey yield changes.

2. Overview of the Representative Operation

The assumptions in this study apply to Tables 1and 2 and pertain to a sample 8,500-colony commercial beekeeping operation in North Dakota that transports colonies to California for pollination and Texas for making splits and overwintering. Colony inventory is defined by the maximum number of strong, viable colonies used for honey production in North Dakota during the summer, 8,500 colonies in this case, which serves as the benchmark for classifying operation size. The production practices, cost allocations, and inputs reflect a well-managed, migratory beekeeping enterprise operating across state lines for pollination and honey production. While actual practices vary by operator and region, these assumptions represent typical conditions for a large-scale beekeeping business operating in these states.

This analysis estimates the annual costs of an ongoing commercial operation under the assumption that the beekeeper has been managing at this scale in previous years and will continue doing so into future seasons. Table 2 outlines capital investments used to estimate annual capital recovery based on 2025 purchase prices. Table 2 does not include costs such as land purchase or business formation, however, it does include ownership costs of buildings and transportation equipment. Costs and inputs vary significantly between operations especially regarding management strategies and transportation logistics so not all figures will apply universally for all operations.

In this operation, approximately 5,000 colonies are sent to California for almond pollination in the winter while honey is produced and extracted only during the summer in North Dakota. Because overwinter losses are expected, beekeepers typically maintain more colonies in the summer and fall than they rent out for almond pollination. Beekeepers increase their colony numbers after almond pollination by splitting or purchasing additional colonies (through queen rearing, nucleus colonies, and/or package bees).

The following provides an overview of assumptions for this well-managed migratory beekeeping operation:

- January- April: 5,000 colonies are transported from Texas, where they were overwintered, to California for almond pollination. Colonies not used in pollination contracts are maintained in holding yards, where they receive protein and carbohydrate supplements to support colony health and development.
- April–May: Following pollination in California, colonies return to Texas, where colonies are split to replace winter losses and increase total colony numbers. Newly established splits are supplied with purchased queen cells and provided protein and carbohydrate supplements to promote colony growth prior to the honey production season.
- June–September: Approximately 7,200 colonies are transported from Texas to North Dakota. Most colonies are placed in various forage locations to produce honey, while approximately 700 colonies are maintained in nearby holding yards for colony buildup

and replacement purposes. Honey is produced and extracted in North Dakota. Each colony is assumed to produce an average of 70 pounds of honey annually.

- October–December: Following honey extraction, all colonies are transported to Texas for overwintering. During this period, colonies receive routine pest and disease management treatments, including control measures for *Varroa destructor* and other common honey bee pests, to maintain colony health and prepare colonies for the next production cycle.

In this study, fixed and overhead costs are distributed across the entire 8,500-colony operation. Input prices, wages, and equipment costs are based on 2025 values and reflect cash costs, salvage value, economic depreciation (capital recovery), and, where applicable, annual repair percentages. The operator is assumed to be a full-time beekeeper, with no other agricultural enterprises.

3. Production Practices and Colony Management

Land Rent and Apiary Access

Commercial beekeeping is migratory, and colonies are trucked to different locations throughout the year. These locations can be loosely grouped in three types: crops with pollination fees, crops or rangeland locations with access to bee forage, and holding yards with little forage access. While many beekeepers own holding yards or honey locations, often close to their home base, access to most other locations must be secured through some agreement or contract with land managers, public or private. For this cost study, holding yards in California are assumed to require annual rental payments of approximately $7,000. In North Dakota, apiary sites used for honey production are assumed to be compensated through in-kind payments. This operation is assumed to utilize approximately 195 apiary locations and the landowners of those locations are compensated with approximately 36 pounds of honey per location (one 12-count case of quart jars of honey). This results in an estimated 7,020 pounds of honey being provided as apiary rent each year. Rather than being recorded as a cash expense, the value of honey provided to landowners is deducted from gross honey revenue to reflect the reduced volume of honey available for sale.

Overwintering Indoor Storage

Overwintering indoor storage is an increasing practice which involves protecting hives from the cold and moisture in climate-controlled buildings. This can help increase colony survival over the winter. For this study we assume the beekeeper will not be storing their colonies indoor over the winter. They will be moved to Texas holding yards for overwintering to prepare before being transported to California for pollination.

Operations Calendar

The operations calendar outlines annual activities for the migratory beekeeping operation, including pollination services, honey production, colony management, and interstate transportation. Dates for the operation are approximate.

Each year begins with overwintering in Texas holding yards from October through January, where colonies are monitored, fed protein and carbohydrate supplements, and treated for pests and diseases to prepare for the upcoming pollination season. In January, colonies are transported to California for almond pollination. Following almond pollination, colonies return to Texas, where splits are made to replace losses and increase colony numbers. In May, colonies are transported to North Dakota, where they forage and produce honey throughout the summer. Honey is harvested and extracted during late summer and early fall. Following the honey season, colonies are transported back to Texas in September and October, where they are evaluated, fed, treated for pests and diseases, and weaker colonies are requeened or combined in preparation for overwintering.

Colony Losses and Replacement

Colonies are lost throughout the year due to disease, pests, and other factors, with the rate varying across operations and from year to year. For consistency, losses are calculated as a percentage of the maximum number of colonies, 8,500. For this operation, winter losses are estimated at 26 percent (2,189 hives) and summer losses at 18 percent around (1,547 hives).

To compensate for these losses, beekeepers replace colonies primarily through splitting the strong colonies, a management strategy that increases colony numbers ahead of the honey production season. Following almond pollination, healthy colonies are split, and new queens are introduced to establish replacement hives.

Queen Bee Purchases

Large-scale commercial beekeeping operations often produce replacement colonies internally through splitting rather than purchasing nucleus colonies and/or package bees. Therefore, this study assumes that replacement colonies are generated within the operation, and only queen cells and mated queens are purchased. The operation is assumed to requeen 95% of colonies with queen cells costing $6.00 per cell. A queen cell acceptance rate of 75 percent is assumed. Colonies that do not establish a queen from a queen cell are requeened with purchased mated queen at a cost of $30 per queen. This approach reflects common commercial management practices while ensuring that the target number of successful requeening events and colony splits are achieved.

Table A: Operations Calendar

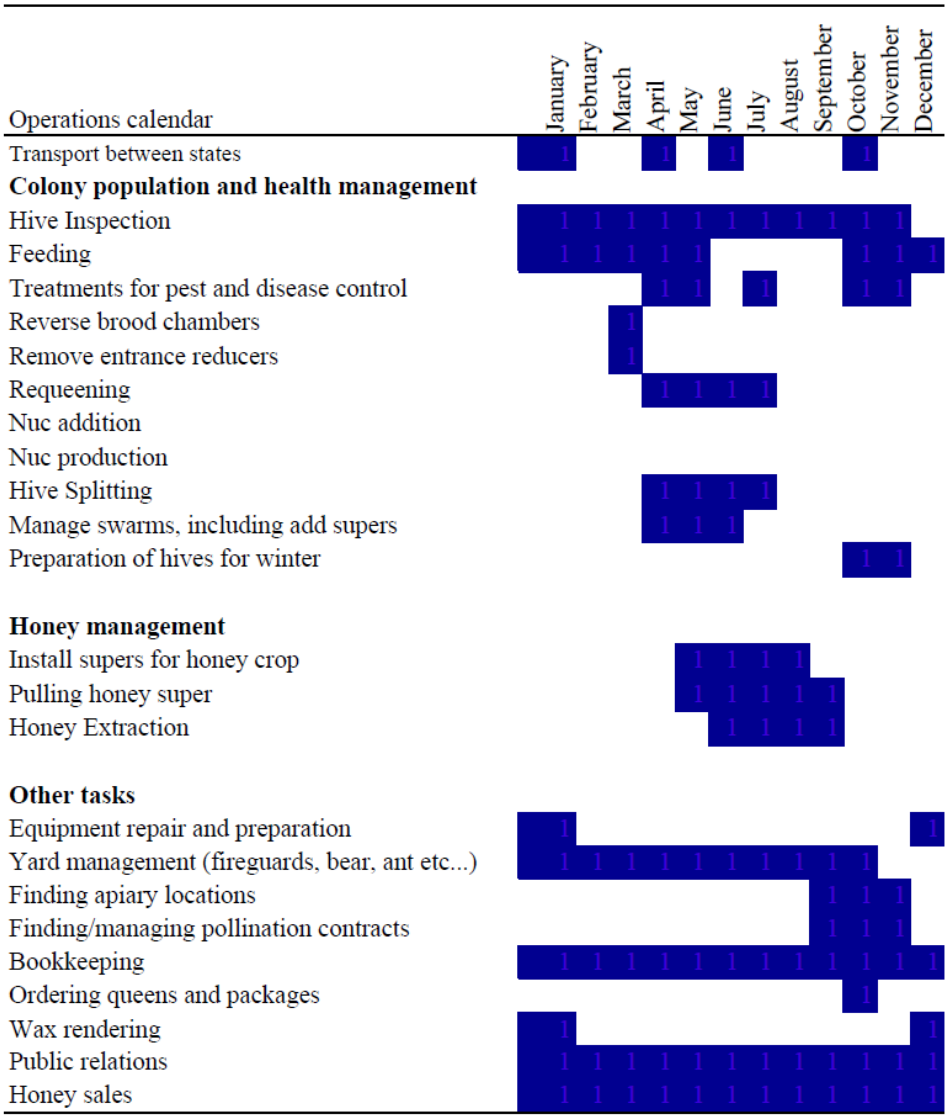


Table B: Colony Inventory and Locations

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Maximum	Percentage of Max Colonies
Almond	0	5,000	5,000	0	0	0	0	0	0	0	0	0	5,000	59%
Crop #2	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
Crop #3	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
Honey Producing Location	0	0	0	0	0	7800	7800	7800	0	0	0	0	7800	92%
Holding Yards	5,036	36	36	6,043	7,252	700	700	275	7,650	7,225	6,430	5,723	7,650	90%
Total colonies	5,036	5,036	5,036	6,043	7,252	8,500	8,500	8,075	7,650	7,225	6,430	5,723	8,500	100%
													Year Total	
Splitting	0	0	1,007	1,209	1,523	0	0	0	0	0	0	0	3,739	44%
Summer Losses	0	0	0	0	272	0	425	425	425	0	0	0	1,547	18%
Fall/Winter Losses	0	0	0	0	0	0	0	0	0	795	707	687	2,189	26%

Supplemental Feed

Beekeepers typically provide feed added as a supplement to the pollen and nectar collected by bees. Feed costs are calculated from the market value of sugar and pollen protein patties. Beekeepers typically purchase supplemental feed from commercial beekeeping suppliers. In this study, the operation is assumed to annually feed 9 gallons of sugar syrup per hive at $4.00 per gallon and 5 pounds of protein patties per hive at $1.90 per pound.

Pest and Disease Treatment

Treatments for pests and diseases are applied to each hive to maintain colony health, particularly during periods of stress such as overwintering and early-season buildup. Effective management of Varroa mites is essential for maintaining colony strength and ensuring pollination readiness. Common treatment products include amitraz, oxalic acid, and formic acid, each applied at different points in the production cycle.

In this study, amitraz (Apivar) is applied at a rate of four strips per colony per treatment, with two treatments annually, resulting in an estimated annual treatment cost of $17.36 per hive. Oxalic acid (VarroxSan) is applied using strip formulations at a rate of eight strips per colony once annually during the summer, resulting in an estimated annual cost of $16 per hive. Formic acid (Formic Pro) is applied at a rate of two strips per colony once annually during the spring, resulting in an estimated annual cost of $5.40 per hive. Product costs are calculated based on the quantity of strips used per colony and the assumed frequency of application.

4. Labor

Owner Management and Hired Labor

Owner/Operator labor for checking hives, management, and all other tasks shared with hired labor is not included as an explicit cost. Any returns above total costs are considered returns to the owner for their labor, and management. We assume the typical workload for hired labor is approximately 700-750 hives per worker. In addition to the owner/operator, this operation employs three full-time salaried employees and eight seasonal H-2A laborers. During the peak season, this results in 708 hives per worker.

Salaried Labor

This study assumes labor costs for three full-time salaried employees. Beekeeping is a specialized occupation that requires skill and training, average annual wages for these workers are estimated at $71,000 each. Including an additional 43 percent to cover the employer’s share of federal and state payroll taxes, insurance, and other benefits, the effective labor cost is approximately $101,530 per worker per year.

H-2A Hourly Labor

In addition to salaried staff, seasonal H-2A labor is used for hourly labor and is assumed for honey extraction, pollination activities and other labor-intensive tasks. This study includes eight full-time H-2A workers, each earning $19.00 per hour and employed for up to ten months in compliance with H-2A visa requirements. An additional 10 percent is added to the hourly wages for worker's compensation insurance. Each worker is guaranteed a minimum of 35 hours per week. In addition to wages, the employer incurs costs for visa processing, transportation, weekly travel, association fees, housing, and living allowances. These overhead costs are estimated at approximately $13,707 per H-2A worker annually. As a result, the total annual labor cost is approximately $43,815 per H-2A employee per year.

5. Transportation and Vehicles

Transportation of colonies includes all activities associated with moving hives between Texas, California, and North Dakota for overwintering, pollination, colony expansion, and honey production.

Interstate Hive Hauling

The operation contracts interstate hive transportation from commercial trucking companies rather than maintaining its own fleet of semi-trucks for long-distance travel. Transportation costs are estimated based on the number of colonies moved, the distance traveled between locations, and an average hauling cost of $4.50 per mile. Annual colony transportation is estimated at approximately 90,000 miles, accounting for all colony movements throughout the production cycle and the total number of semi-truck trips required. Transportation requirements are calculated assuming each semi-truck transports an average of 408 colonies per load.

Vehicles

For localized transportation and colony management activities, the operation maintains two Freightliner 114SD trucks equipped with 53-foot trailers, four Hummerbee forklifts, four Ram 5500 trucks with 17-foot beds, and two Ram 1500 pickup trucks. The Freightliner trucks are used primarily for local colony movements within North Dakota, including transporting colonies between holding yards and honey production sites and placing colonies in forage locations. The Ram 5500 trucks are used to transport employees, feed, equipment, and supplies between holding yards, overwintering site, pollination sites, and honey production facilities in Texas, California, and North Dakota. The Ram 1500 pickup trucks are assigned to the owner and the full-time employees for the supervisory, administrative and operational travel between apiaries, warehouses, extraction facilities, and other business locations. Hummerbee forklifts are used for loading and unloading palletized colonies, moving equipment, supporting honey extraction operations, and placing colonies in California almond orchards.

Localized Hive Hauling and Personnel Transportation

Localized hive hauling and personnel transportation between states is estimated at approximately 80,000 miles annually, with operating costs of $0.70 per mile. Forklifts are assumed to operate 960 hours annually across all units, with fuel, maintenance, and lubrication costs estimated at $4.00 per operating hour.

6. Operating Interest

Interest on Operating Capital

Interest on operating capital is based on cash operating costs and is calculated monthly at a nominal rate of 9 percent per year. When net revenues are greater than zero, no interest accumulates.

7. Equipment and Buildings

Hive Management Equipment

Includes tools and protective gear used to work colonies. Items include smokers, veils, hive tools, bee blowers, suit, and respiratory protection.

Hive Woodenware

The operation requires standard hive equipment, including brood boxes with deep supers (9-5/8"), deep frames and foundations, medium honey supers (6-5/8"), medium frames and foundations, bottom boards, inner and outer covers, pallets, fume boards, gallons paint, and feeders.

Honey Extraction Equipment

Honey extraction equipment includes a 60-frame extractor with air assist, uncapper, deboxer, hot water supply system, wax collection system, 3-inch progressive cavity pump, 2-inch gear pump, overhead empty box return system, wax trap, and a section for potential miscellaneous extraction equipment. These components are used to debox and uncap honey supers, extract honey from frames, recover and collect wax and residual honey, transfer honey throughout the extraction process, and prepare extracted honey for storage or sale. Most of these components are typically purchased as an integrated honey extraction system from commercial beekeeping equipment manufacturers rather than as individual pieces of equipment.

Buildings

The representative operation includes facilities in both North Dakota and Texas. In North Dakota, the operation maintains a honey extraction facility, an office/shop, and a warehouse. The honey extraction facility is approximately 8,000 square feet, the office/shop is 7,200 square feet,

and the warehouse is 10,000 square feet. Construction costs are assumed to be $150 per square foot for all facilities. In Texas, where colony splits are established in the spring and pest and disease treatments are applied during the fall, the operation maintains a combined office, shop, and warehouse facility of approximately 10,000 square feet. Construction costs are also assumed to be $150 per square foot. Annual repair costs are estimated at 2 percent of construction cost.

Warehouse and Honey Extraction Room

From late summer until fall, beekeepers will remove honey-filled supers from hives and truck them back to the main operation location for honey extraction and storage in North Dakota. Most beekeepers own their own extraction equipment which must be housed in a temperature-controlled room since honey is best extracted between 70 and 80 °F. Honey supers waiting to be processed must be stored indoors in a bee-tight environment to prevent robbing. Equipment, feed and veterinarian products are also stored in the warehouse throughout the year.

8. Cash Overhead

Cash overhead consists of various cash expenses paid out during the year that are assigned to the whole business. These costs can include property taxes, office expense, liability and property insurance, equipment repairs, utilities, and investment repairs.

Utilities

Utility expenses are included as operating costs for all buildings maintained by the representative operation. Facilities include an 8,000-square-foot honey extraction facility, a 7,200-square-foot office/shop, and a 10,000-square-foot warehouse in North Dakota, as well as a 10,000-square-foot office/shop/warehouse facility in Texas. Utility costs are estimated at $2.00 per square foot annually, resulting in total utility expenses of approximately $70,400 per year. This estimate includes electricity, water, heating, cooling, and other general utility expenses associated with colony management, honey extraction, and facility operations.

Property Taxes

Annual property taxes are included as an overhead expense for buildings maintained by the representative operation in both Texas and North Dakota. Property taxes are estimated using an assumed tax rate of 0.75 percent applied to the taxable value of the operation's buildings. Total annual property tax expenses are estimated at approximately $39,600.

Liability Insurance

In this study, $24,000 is charged to the beekeeping operation as a standard farm property and liability insurance policy. This insurance covers all vehicles, buildings and equipment and any expenses for which the operation would become legally obligated to pay for bodily injury claims on the property and damages to another person’s property because of a covered accident.

Annual Capital Repair

All equipment, transportation assets, and buildings are assumed to require annual repairs equal to 2 percent of their purchase price. For this operation, total annual repair costs are estimated at approximately $151,682 which is included under Cash Overhead Costs.

9. Non-cash Overhead

Non-cash overhead is calculated as the capital recovery cost for equipment and other apiary investments.

Capital Recovery Costs

Capital recovery cost is the annual depreciation and interest costs for a capital investment. This includes equipment, machinery and bees. It is the amount of money required each year to recover the difference between the purchase prices and salvage value (unrecovered capital). It is equivalent to the annual payment on a loan for the investment with the down payment equal to the discounted salvage value. This is a more complex method of calculating ownership costs than straight-line depreciation and opportunity costs, but more accurately represents the annual costs of ownership because it takes the time value of money into account (Boehlje and Eidman 1984). The formula for the calculation of the annual capital recovery costs is: ((Purchase Price – Salvage Value) x Capital Recovery Factor) + (Salvage Value x Interest Rate). Beekeeping and transportation equipment is purchased new or used, but the study shows the current purchase price for new equipment. Capital recovery costs are adjusted to 60 percent to indicate a mix of new and used equipment.

Salvage Value

Salvage value is an estimate of the remaining value of an investment at the end of its useful life. For farm machinery (tractors and implements), the remaining value is a percentage of the new cost of the investment (Boehlje and Eidman 1984). In this study, Salvage values were estimated based on the expected resale value of comparable used equipment at the end of the asset's useful life. Semi-trucks, forklifts, Dodge Ram trucks, and honey extraction equipment were assumed to retain 20 percent of their original purchase value. For other investments, including buildings and miscellaneous equipment, a salvage value of zero was assumed.

Capital Recovery Factor

Capital recovery factor is the amortization factor or annual payment whose present value at compound interest is 1. The amortization factor is a table value that corresponds to the interest rate used and the life of the machine.

Interest Rate

The interest rate of 8.25 percent used to calculate capital recovery cost is the effective long-term interest rate. The interest rate will vary according to risk and amount of loan.

10. Revenue

Pollination Fees

Pollination contracts establish the rental/pollination fee of hives and are established several months in advance. Pollination contracts also establish a quality standard based on frame counts and higher frame counts are compensated with premium prices. Several contract options exist with 8-frame averages and 4-frame minimum being common (the average frame count among sampled hives must equal or exceed 8 while hives with 4 frame or less are not counted). Most pollination contracts are established long in advance, often carried from year to year, but spot contracts are sometimes required to adjust to unexpectedly large winter losses. In this study, the beekeeper is assumed to have long-term contracts.

For this study we assume the pollination fee for almonds is $195 per hive for the standard 8-frame average and 4-frame minimum contract. This fee is in line with recent figures published in the USDA Cost of Pollination Survey. We assume that nearly all (99%) of the colonies that survive the winter meet the standard contract specifications and are rented out for almond pollination. A sensitivity analysis provided in Table 3 evaluates net returns across different almond pollination fees and percentages of colonies that meet contract specifications and are available for rental.

Honey

We assume on average each colony produces 70 pounds of honey. Once in drums, honey can be sold to packaging and processing operations or bottled and sold in a variety of marketing channels. In this study, the beekeeper is assumed to sell honey drums without further re-packaging. Honey will only be produced and extracted in North Dakota. We use a honey sales price of $1.90 per pound. A sensitivity analysis provided in Table 4 evaluates net returns across different honey prices and yields.

Other Apiary Products

Wax, propolis, royal jelly or pollen can also be sold, mostly in retail channels. Non-honey products represent at most a very small revenue for commercial beekeepers who focus on pollination and bulk honey. Wax sales are included in this study for completeness as wax is always produced during the honey extraction process at a rate of around 2 percent of honey production. In this study, the beekeeper sells wax at a price of $3.50 per pound.

USDA Programs

The USDA, through the Risk Management Agency (RMA) and the Farm Services Agency (FSA), offers insurance programs that provide risk protection and financial assistance to commercial beekeepers. The Apiculture Pilot Insurance Program (API) insures honey production based on a rainfall index that correlates with regional forage conditions. In addition, the Emergency Assistance for Livestock, Honey bee, and Farm-Raised Fish Program (ELAP) administered by FSA provides disaster relief for an operation that experiences high colony losses, feed shortages, or other adverse weather-related impacts. While participation in the Apiculture Pilot Insurance Program is not assumed in this study, the representative operation is assumed to participate in ELAP and receive eligible disaster assistance payments when annual colony losses exceed program thresholds. Therefore, ELAP payments are incorporated into the cost and return analysis as a form of risk mitigation available to commercial beekeeping operations.

11. References

Baylis, Kathy, Elinor M. Lichtenberg, and Erik Lichtenberg. 2021. "Economics of Pollination." Annual Review of Resource Economics 13: 335–354. https://doi.org/10.1146/annurev-resource-101420-110406.

Boehlje, Michael D., and Vernon R. Eidman. 1984. Farm Management. New York: John Wiley & Sons.

Edwards, William. 2026. Estimating Farm Machinery Costs. Ag Decision Maker File A3-29, PM 710. Ames, IA: Iowa State University Extension and Outreach.

Jones Ritten, Chian, Dannele Peck, Mariah Ehmke, and M. A. Buddhika Patalee. 2018. "Firm Efficiency and Returns-to-Scale in the Honey Bee Pollination Services Industry." Journal of Economic Entomology 111 (6): 2564–2571. https://doi.org/10.1093/jee/toy075.

Lee, Hyunok, Daniel A. Sumner, and Antoine Champetier. 2018. "Pollination Markets and the Coupled Futures of Almonds and Honey Bees: Simulating Impacts of Shifts in Demands and Costs." American Journal of Agricultural Economics 100 (3): 849–868. https://doi.org/10.1093/ajae/aax079.

Mann Lake Ltd. 2024. Beekeeping Supplies and Equipment. Hackensack, MN: Mann Lake Ltd. https://www.mannlakeltd.com/.

Sanderson, M. A. 2016. "Forage and Grasslands as Pollinator Habitat in North Dakota." Crop, Forage & Turfgrass Management 2: 1–6. https://doi.org/10.2134/cftm2016.08.0061.

USDA National Agricultural Statistics Service. 2024. Quick Stats Database. Washington, DC: U.S. Department of Agriculture. https://quickstats.nass.usda.gov/.