



Florida Cooperative Extension Service

A Study in Profitability for a Mid-Sized Beekeeping Operation¹

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Costs of producing agricultural products have increased much faster than selling price. Apiculture suffers as much, if not more, than other agricultural enterprises because the price of honey has over time not kept up with production costs. Even though the 1970s saw a dramatic rise in world honey prices from which producers profited, over the long run they created competition by foreign producers. Besides far lower labor costs, the search for sources of hard currency, no matter the cost, by countries such as the People's Republic of China has also created havoc in the world honey market.

Historically, it has been unprofitable to produce honey, according to most of the limited studies on the subject. Adams and Todd (1933) figured it cost \$.07 to produce one pound of extracted honey for which the beekeeper received \$.045. Rodenberg (1967) declared that over a ten-year period, the cost of the most important items used by beekeepers increased eighteen percent, while the price of honey decreased seven percent. Coke (1966) analyzed fifteen commercial honey-producing firms in Florida and found a net return of \$-.0261 per pound of honey. A detailed study of southwestern and midwestern beekeepers (1973) concluded:

"Beekeeping for honey production in the United States is not profitable. The unit price received by beekeepers for bulk, extracted honey has not changed in the last twenty-five years, while the

cost of production has increased. Thus, beekeepers, who rely on honey production for income must supplement their income from other sources, such as crop pollination and outside employment."

The purpose of this publication is to help the beekeeper better analyze his or her operation to see if it indeed is profitable. Profitability is defined here in terms of income versus outgo; it is recognized that many beekeepers are not interested in monetary gain, but prefer to keep bees on an amateur basis. This is in no way discouraged, however, the present study may be of interest even to those beekeepers who eschew the profit motive in keeping their bees. Specific objectives of the financial model presented here are:

1. Determine the costs and returns associated with beekeeping.
2. Aid beekeepers with budgeting and planning.
3. Recommend ways to reduce costs and increase returns.
4. Suggest how operation size affects costs and returns.

It is the author's opinion that beekeeping can be a profitable agricultural enterprise. It is also recognized that in order to be profitable, the beekeeping operation must be analyzed carefully and the beekeeper ready to diversify activities based on

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economic imperatives. This publication will examine investment, operating expenses, cash flow and other indices to reflect effects of decision-making at several different levels within a beekeeping operation.

No study is any better than the data or numbers that go into it; this means that the key to making reasonable decisions is adequate record keeping. This simple fact cannot be overemphasized. Without good records of individual colonies and beeyards, there is no way production can be analyzed. The same is true of financial records. If this publication does nothing more than help the beekeeper produce better financial records, it will have served its purpose admirably.

As previously suggested, the beekeeping industry is currently in a state of flux. There are a number of reasons for this, including high interest rates for borrowing funds, expensive manual labor requirements, increasing production costs of all kinds, as well as the virtual river of imported honey entering into the United States each year from the developing world. Beekeepers in the United States have traditionally made their living producing honey, at the same time providing pollination to a wide range of cultivated and non-cultivated plants virtually free of charge. Those suggesting that beekeepers can solve the economic ills of the beekeeping industry by increasing pollination fees are simply not informed about the true nature of this endeavor. As a consequence, this study is based on honey production and seeks to find "niches" of profitability for the beekeeper in that activity.

There are two major strategies, often overlooked by beekeepers, that may be employed to improve profitability. The first is developing a local market based on promoting honey for what it is, a unique product with an excellent reputation as a topping, recipe ingredient or snack. Unfortunately, honey has not been promoted as vigorously as other sweets in the past, and the market has suffered erosion from introduction of substitutes.

A second strategy is to more closely examine management of the beekeeping operation. Traditionally, beekeeping has been an extensive activity. There have always been many locations for bees and moving them from one area to another has been relatively easy. This is no longer the case. Locations, especially in Florida, are at a premium and difficult to come by. In addition, as agricultural areas give way to urban development, prime locations

become even more difficult to find. The time has come to carefully examine the profitability of more intensively managing honey bee colonies. Fortunately, this is possible, for conventional wisdom dictates that intensive bee colony management results in more production per unit.

Intensive financial management is also a concept whose time has come. In the past, financial analysis has taken a back seat to production. This has been true of most agricultural operations, but can no longer be ignored. In-depth financial management takes a good deal of head scratching and pencil pushing. Fortunately, the microcomputer revolution will take some of the burden off the producer by allowing greater ease in financial simulation. As a case in point, the numbers in this publication are developed on templates of a spreadsheet program called Multiplan.

This model and publication examine the profitability of a small-scale beekeeping enterprise with about 500 colonies of bees that moves once a year. The study is specifically for Florida conditions, however, many of the considerations here will apply with some modification to any size operation located in any part of the nation.

PROFITABILITY

Profit is equal to income from an operation minus outgo. If income is more than outgo, profitability is established.

Income is collectively all the returns from an activity, such as money received for sale of bee products (honey, royal jelly, pollen, package bees) or for pollination rental. Selling bees and queens or equipment for one reason or another that normally would be used in an operation is not income, but is considered a reduction in investment or fixed costs.

Outgo includes two kinds of costs: fixed and variable. Fixed costs are those funds expended whether or not any production or sale of products results. In other words, they must be paid whether or not income is produced. Fixed costs include depreciation on equipment, interest expenses, taxes, insurance and rent. Variable costs, on the other hand, generally fluctuate depending on the scale of the operation. Labor is a large variable cost and as more honey is produced, labor costs will go up proportionally. Other variable costs are repairs, fuel, supplies and bee feed.

FIXED COSTS

The following fixed costs are analyzed in this section. They are: building investment, land investment, bee investment, beehive investment, fence investment and machinery investment.

Building

Most operations need a building as a base of operations and place to do honey extraction and equipment repair. The figures in Table 1 show estimated costs of a building with 2500 square feet, at \$17.00 per square foot and a life of 50 years. Annual interest on the building is calculated as follows: (Total investment/2 x .075). The 7.5% interest is an average figure used throughout the fixed cost categories.

Table 1. Estimated Costs of a Building

Number of square feet	2500
Amount per square foot	\$17.00
Total building value	\$42,500.00
Electricity	300.00
Air	100.00
Truck Doors	250.00
Total building investment	\$43,150.00
Trade in value (none)	\$0.00
Years to depreciate	18
Annual depreciation	(ACRS) \$3,883.50
Annual interest*	\$1,618.13
ACRS	\$3,883.50 9% 1st & 2nd year
Depreciation	\$3,452.00 8% 3rd year
(18 year	\$3,020.50 7% 4th & 5th years
property class)	\$2,589.00 6% 6th year
	\$2,157.50 5% 7th & 8th years
	\$1,726.00 4% until year 19
* (Represents potential interest income if funds were placed elsewhere)	

ACRS is the Accelerated Cost Recovery System instituted in 1981. First year's depreciation is \$3,883.50. Caution: Consult your attorney, accountant or tax preparer for the latest IRS rules. The figures presented in Table 1 for both interest and depreciation are not necessarily those best for all years and all operations.

Land

The operation may have investments in land besides the building mentioned above. Here land investment is estimated to be \$1,875.00. Land cannot be depreciated; the interest cost is calculated as shown in Equation 1 and Table 2:

$$2 \times \frac{\text{total land investment}}{2} \times .075$$

Various land invested in	\$ 1875.00
Trade-in value	1875.00
Annual depreciation (none)	0.00
Annual interest on investment	140.63

Bees

The bee investment is separated into two areas. It is calculated on the basis of 500 packages purchased at \$18.00. The bees have no depreciable value and the interest rate on the investment is calculated the same as for the land (Equation 1 and Table 3).

Number of packages (new colonies)	500
Price per package	\$ 18.00
Total package costs	9000.00
Other associated costs	0.00
Total investment in bees	9000.00
Trade-in value	0.00
Annual depreciation (none)	0.00
Annual interest	\$ 675.00

Hives

The estimated costs of putting one colony together are listed in Table 4. Costs are based on making 500 hives, each consisting of one brood chamber and five supers. Notice that over 70% of the costs are in beeswax (foundation), supers (wooden ware) and labor. Hive investment is depreciable and the interest on the investment is calculated the same as for the building.

Fence

A major predator of honey bee colonies in Florida is the black bear. The estimated fixed costs associated with three bear fences are listed in Table 5. Fences have a seven-year estimated life; annual

interest rate on the investment is calculated the same as for the building.

Table 4. Costs Per Colony

Costs per colony	Percent of Cost	
1 Hive bottom	\$4.80	4%
5 Standard supers @ \$5.80/ea	\$29.00	22%
50 Standard frames \$.42/ea	\$21.00	16%
50 Sheets foundation \$.70/ea	\$35.00	26%
Rabbits 2/super x 5 @ \$.25/pr	\$2.50	2%
1 Inner cover @ \$2.95	\$2.95	2%
1 Entrance reducer @ \$.25	\$0.25	0%
1 Hive cover @ \$4.25/ea	\$4.25	3%
1 Quart paint @ \$3.00	\$3.00	2%
8 hours labor @ \$3.85/hr	\$30.80	23%
Total per new colony built	\$133.55	100%
Number of new colonies built	500	
Total hive investment	\$66,775.00	
Trade in value	\$0.00	
Years to depreciate	10	
Annual depreciation	(ACRS) \$5,342.00	
Annual interest	\$2,504.06	
ACRS Depreciation template for hives - 10 year class property	\$5,342.00 \$9,348.50 \$8,013.00 \$6,677.50 \$6,009.75	8% first year 14% second year 12% third year 10% 4th - 6th year 9% 7th - 10th year
Caution: A case can be made to place hives in different property classes. Consult your accountant!		

Table 5. Costs Per Fence

	Percent of Cost	
1 Roll wire	\$15.00	7%
14 Posts	109.90	51%
Insulators	14.56	7%
Fencer	50.00	23%
Labor:		
2.5 hours @ \$7.15/hr	17.88	8%
2.5 hours @ \$3.85/hr	9.63	4%
Total	\$216.96	100%
Total number of fences	3 times \$216.96 (previous screen)	
Total fence investment	\$650.88	
Trade in value	\$0.00	
Years to depreciate	5	
Annual depreciation	\$136.68 (ACRS)	
Annual interest	\$24.47	

Table 5. Costs Per Fence

	Percent of Cost	
ACRS Depreciation template for fence - 5 year class:	First year @ 15%	\$97.63
	Second year @ 22%	\$143.19
	Third thru fifth @ 21%	\$136.68

Machinery and Equipment

Estimated fixed costs of machinery and equipment associated with this scale of operation are detailed in Table 7. Replacement values for the 3/4 ton truck and used 1/2 ton truck are based on 50% personal use and 50% business use. Interest on each of these investments is calculated the same as for the building.

A summary of investment (fixed) costs (Table 7) for this operation is outlined in Table 8. These are only estimates. Certain investment costs may or may not occur, depending on circumstances. Column two reveals a total investment of \$284.01 per hive. The third column provides an idea of the percentage of investment each category represents. Notice that hives make up 47% of the investment, the building is 30% and machinery and equipment are 14%.

How the investment is financed is also important. Table 6 is a suggested financing scenario and a detail of the monthly payments necessary for cash flow analysis is shown in Table 9. A total of \$142,005.88 is to be financed over five years at 12%. This means a monthly payment of \$2,717.63. A good portion of this is tax deductible interest expense.

Total financial investment	\$ 142,005.88
Amount down	\$ 19,834.88
To finance:	\$ 122,171.00
Interest rate	12%
Years to finance	5
Monthly Payments are:	\$ 2,717.63

Another fixed cost item is repairs on machinery and equipment, hives, building, etc. They are estimated here at one percent of investment and listed in Table 10. This means a monthly repair bill of \$103.44.

Table 7. Equipment

Equipment Item	Replacement Value	Salvage Value	Depreciation Value	Annual Depreciation	Annual Interest
3-Year Class					
3/4 ton truck	(1) \$5,000.00	\$840.00	\$4,160.00	----	\$219.00
5th wheel trailer	5,000.00	900.00	4,100.00	----	221.25
Used 1/2 ton truck	(1) 2,000.00	100.00	1,900.00	----	78.75
Total 3-year class	(2) \$12,000.00	\$1,840.00	\$10,160.00	(3) \$2,540.00	\$519.00
5-Year Class					
Extractor	\$1,700.00	\$510.00	\$1,190.00	----	\$82.88
Whirl dry	1,200.00	360.00	840.00	----	58.50
Brand Melter	800.00	50.00	750.00	----	31.88
Sump pump tank	500.00	50.00	450.00	----	20.63
Uncapper	100.00	0.00	100.00	----	3.75
4-1000 lb tanks	620.00	180.00	440.00	----	30.00
Boiler	50.00	0.00	50.00	----	1.88
Feeders	500.00	0.00	500.00	----	18.75
Moving screens	600.00	0.00	600.00	----	22.50
5 batteries	200.00	0.00	200.00	----	7.50
Bee blower	450.00	0.00	450.00	----	16.88
Storage containers	1,835.00	0.00	1,835.00	----	68.81
Total 5-year class	(4) \$8,555.00	\$1,150.00	\$7,405.00	(5) \$1,110.75	\$363.94
Totals for Annual Summary	\$20,555.00	\$2,990.00	\$17,565.00	\$3,650.75	(6) \$882.94

Table 7. Equipment

Equipment Item	Replacement Value	Salvage Value	Depreciation Value	Annual Depreciation	Annual Interest
(1) Based on 50% personal use. (2) Annual depreciation for 3-yr class property (ACRS Depreciation template): \$2,540.001st year @ 25% \$3,860.802nd year @ 38% \$3,759.203rd year @ 37% (3) Annual depreciation for 5-yr class property: (ACRS Depreciation template): \$1,110.751st year @ 5% \$1,629.102nd year @ 22% \$1,555.053rd - 5th @ 12% (4) Total cost to estimate 3-year repair costs less trucks: \$5,000.00 (5) Total cost to estimate 5-year repair costs: \$8,555.00 (6) Interest = replacement cost plus salvage value/2 * .075					

Table 8. Summary of Fixed Costs

	Replacement Value	Inv. Cost per Hive	Percent of Investment	Trade in Value	Annual Depreciation	Annual Interest
Building	\$43,150.00	\$86.30	30%	\$0.00	\$3,883.50	\$1,618.13
Hives	66,775.00	133.55	47%	0.00	5,342.00	2,504.06
Bees	9,000.00	18.00	6%	0.00	0.00	675.50
Machinery	20,555.00	41.11	14%	2,990.00	3,650.75	882.94
Fences	650.88	1.30	0%	0.00	97.63	24.41
Land	1,875.00	3.75	1%	1,875.00	0.00	140.63
Totals	\$142,005.88	\$284.01	100%	\$4,865.00	\$12,973.88	\$5,845.16

Table 9. Payment Schedule

Payment Number	Principal	Interest	Balance
1	\$1,495.92	\$1,221.71	\$12,0675.08
2	1,510.88	1,206.75	11,9164.21
3	1,525.99	1,191.64	11,7638.22
4	1,541.25	1,176.38	11,6096.98
5	1,556.66	1,160.97	11,4540.32
6	1,572.23	1,145.40	11,2968.10
7	1,587.95	1,129.68	11,1380.10
8	1,603.83	1,113.80	10,9776.30
9	1,619.87	1,097.76	10,8156.40
10	1,636.07	1,081.56	10,6520.40
11	1,652.43	1,065.20	10,4867.98
12	1,668.95	1,048.68	10,3199.04
Totals	\$18,971.96	\$13,639.55	

Table 10. Repairs on Machinery and Equipment

	Investment	Est. Repair	Per month
Building @ 1% of cost	\$43,150.00	\$431.50	\$35.96

Table 10. Repairs on Machinery and Equipment

	Investment	Est. Repair	Per month
Hives @ 1% of cost	66,775.00	667.75	55.65
Machinery, 3-year class @ 1%	5,000.00	50.00	4.17
Machinery, 5-year class @ 1%	8,555.00	85.55	7.13
Fences @ 1% of cost	650.00	6.51	0.54
Total		\$1241.31	\$103.44

VARIABLE COSTS

Estimated variable costs for this operation follow. Again, these vary according to number of colonies operated and amount of product (honey) produced. In order to analyze these costs, the first thing to do is examine the beekeeper's activities throughout the year. Keeping bees is a seasonal occupation, hectic to frenzied in pace during spring and summer, while often providing an abundance of time in fall and winter.

The following is a probable sequence of events for a 500 colony beekeeping operation in Florida. It is based on one move per year to take advantage of the citrus flow. The figures provided here are aggregates of all the yards in the operation, which might number as many as twelve to sixteen. Costs are accounted for according to the month accrued and fed into a yearly cash flow statement for comparison and to aid in financial planning.

In Florida, the beekeeping year can start as early as January. During this month, the beekeeper makes his first colony inspection and may begin to feed the bees for population buildup. The estimated costs in Table 11 for the month of January are for 450 colonies, supposing a 50 colony loss over winter from the usual 500. The total number of hives will be brought to 500 in February.

In February, maple and willow are blooming heavily and populations are beginning to increase rapidly. At this time, the beekeeper makes increase or divisions to replenish colony numbers, 50 new colonies are made by divisions. The estimated costs for the month of February are shown in Table 12.

Beekeeping gets into full swing in March, and colonies are moved into the citrus groves and supered up by the middle of the month. The estimated costs for March 1 through 15 are shown in Table 13.

From the middle of March to mid April, citrus honey is harvested and extracted. The estimated costs for March 15 through April 15 are shown in Table 14.

From mid April until the end of May, the bees are moved from citrus into gallberry and/or palmetto locations. The estimated costs for April 15 through May 20 are shown in Table 15.

The end of May and first half of June marks the harvest of gallberry and palmetto honey. The estimated costs for May 20 through June 15 are shown in Table 16.

Extraction is finished up in June and July. The honey is also being packed at this time. The estimated costs from June 15 through July 15 are shown in Table 17.

From mid July until September 1, there is little work in the bee yard. However, packing and marketing the crop is in full swing. Beginning some time in September, colonies are requeened and fed in preparation for winter. The estimated costs for July 15 through September 15 are shown in Table 18.

During the latter part of September, colonies are checked for queen acceptance and population level. A further, final inspection occurs in October or November and colonies weak in numbers are combined with stronger ones, in keeping with the beekeeper's philosophy of taking winter losses in the fall. The estimated costs for September 15 through November 15 are shown in Table 19.

There are a number of miscellaneous activities for the beekeeper to be engaged in from November through December. These include hive maintenance (repair and painting) and perhaps most important, planning for the coming year. The estimated costs for November 15 through December 31 are shown in Table 20.

Totals for the year for each category along with the percentage accounted for by each are provided in Table 21. This shows that operator labor, hired labor, sugar and queen costs are high in comparison to other categories (drugs, trucking). Reducing queen costs, for example, might provide savings, although stock performance should never be slighted in intensive bee management. Hired labor too, may be substituted for operator labor, which is less expensive per hour by comparison.

Table 11. Estimated Costs for January

	@	Total	Hours
10 lb sugar	\$.25/lb x 450 colonies	\$1125.00	---
.01 lb TM 25	\$6/lb x 450 colonies	\$27.00	---
10 min operator labor / colony X 450	\$6.50/hr	\$487.50	75
5 min hired labor / colony X 450	\$3.50/hr	\$131.25	37.5
150 truck miles	\$.32/mile	\$48.00	---
2 hr operator drive time	\$6.50/hr	\$13.00	2
1 hr hired drive time	\$3.50/hr	\$3.50	1

Note: Terramycin (TM 25) is routinely used as a disease preventative in most beekeeping operations.

Table 12. Estimated Costs for February

	@	Total	Hours
7 lb sugar	\$.25/lb x 50 colonies	\$87.50	--
10 min operator labor / colony X 50	\$6.50/hr	\$54.17	8
5 min hired labor / colony x 50	\$3.50/hr	\$14.58	4
20 truck miles	\$.32/mile	\$6.40	--
1 hr operator drive time	\$6.50/hr	\$6.50	1
1 hr hired drive time	\$3.50/hr	\$3.50	1
50 queens	\$5.00/ea	\$250.00	--

Table 13. Estimated Costs for March (1 - 15)

	@	Total	Hours
10 min operator labor / colony x 500 colonies	\$6.50/hr	\$541.67	83
10 min hired labor / colony x 500 colonies	\$3.50/hr	\$291.67	83
800 truck miles	\$.32/mile	\$256.00	--
8 hr operator drive time	\$6.50/hr	\$52.00	8
8 hr hired drive time	\$3.50/hr	\$28.00	8
Meals, hotel, telephone	---	\$160.00	--

Table 14. Estimated Costs for March 15 - April 15

	@	Total	Hours
Pull Citrus Honey on 500 colonies:			
5 min operator labor / colony x 500 colonies	\$6.50/hr	\$270.83	42
5 min hired labor / colony x 500 colonies	\$3.50/hr	\$145.83	42
500 truck miles	\$.32/mile	\$160.00	--
5 hr operator drive time	\$6.50/hr	\$32.50	5
5 hr hired drive time	\$3.50/hr	\$17.50	5
Meals, hotel, telephone	---	\$160.00	--

Table 14. Estimated Costs for March 15 - April 15

	@	Total	Hours
Extract Citrus Honey on 500 colonies:			
50 hr operator labor X 500 colonies	\$6.50/hr	\$325.00	50
50 hr hired labor X 500 colonies	\$3.50/hr	\$175.00	50
100 truck miles	\$.32/mile	\$32.00	--
2 hr operator drive time	\$6.50/hr	\$13.00	2
2 hr hired drive time	\$3.50/hr	\$7.00	2

Table 15. Estimated Costs for April 15 - May 20

	@	Total	Hours
10 min operator labor / colony x 500 colonies	\$6.50/hr	\$541.67	83
10 min hired labor / colony x 500 colonies	\$3.50/hr	\$291.67	83
800 truck miles	\$.32/mi	\$256.00	--
8 hr operator drive time	\$6.50/hr	\$52.00	8
8 hr hired drive time	\$3.50/hr	\$28.00	8
Meals hotel, telephone	---	\$160.00	--

Table 16. Estimated Costs for May 20 - June 15

	@	Total	Hours
5 min operator labor / colony x 500 colonies	\$6.50/hr	\$270.83	42
5 min hired labor / colony x 500 colonies	\$3.50/hr	\$145.83	42
500 truck miles	\$.32/mile	\$160.00	--
5 hr operator drive time	\$6.50/hr	\$32.50	5
5 hr hired drive time	\$3.50/hr	\$17.50	5
Meals, hotel, telephone	---	\$160.00	--

Table 17. Estimated Costs for June 15 - July 15

	@	Total	Hours
40 hr operator labor	\$6.50/hr	\$260.00	40
40 hr hired labor	\$3.50/hr	\$140.00	40
200 truck miles	\$.32/mile	\$64.00	---
2 hr operator drive time	\$6.50/hr	\$13.00	2
2 hr hired drive time	\$3.50/hr	\$7.00	2

Table 18. Estimated Costs for July 15 - September 15

	@	Total	Hours
250 queens	\$5.00/ea	\$1250.00	--
10 lb sugar	\$.25 x 500 colony	\$1250.00	--
.01 TM 25	\$6/lb x 500 colony	\$30.00	--
1 tsp fumagillin	\$1.30 x 500	\$650.00	--
10 min operator labor / colony	\$6.50 (500)	\$541.67	83
5 min hired labor / colony	\$3.50 (500)	\$145.83	42
300 truck miles	\$.32/mile	\$96.00	--
3 hr operator drive time	\$6.50/hr	\$19.50	3
3 hr hired drive time	\$3.50/hr	\$10.50	3

Table 19. Estimated Costs for September 15 - November 15

	@	Total	Hours
5 min operator labor x 250 colonies	\$6.50/hr	\$135.42	21
150 truck miles	\$.32/mile	\$48.00	--
3 hr operator drive time	\$6.50/hr	\$19.50	20

Table 20. Estimated Costs for November 15 - December 31

	@	Total	Hours
Maintenance 200 operator labor hrs.	\$6.50/hr.	\$1300.00	200
Maintenance 200 hired labor hrs.	\$3.50/hr.	\$700.00	200
600 truck miles	\$.32/mile	\$192.00	---
Planning 40 operator hrs.	\$6.50/hr.	\$260.00	40

Table 21. Annual Totals and Percentages

	Sugar	Drug	Misc.	Operator Labor	Hired Labor	Truck	Queens
Annual totals	\$2,462.50	\$707.00	\$640.00	\$5,242.25	\$2,304.17	\$1,318.40	\$1,500.00
Percent of total	17%	5%	5%	37%	16%	9%	11%
Total operator hours = 823							
Total hired hours = 658							
Total truck miles = 4120							
Total or 100% of costs are \$14,174.32							

RETURN

Now that production costs have been examined, they must be offset by income from the operation. There are two major ways honey is sold by the beekeeper: retail and wholesale. Most large beekeepers sell on the wholesale market; the crop is extracted, packed in fifty-five gallon drums and

shipped off to be processed by middlemen, called packers. Alternatively, the beekeeper may prefer to develop a local market and sell retail.

This study seeks to examine the effects of both wholesaling and retailing honey. As such, it assumes the beekeeper will do some of both. The honey return per colony in this study is estimated to be 106

pounds. This is an optimistic figure and represents an average of about 50 pounds per major flow (citrus, gallberry). This yield multiplied by the number of colonies equals 53,000 pounds. The following are estimated costs and returns for retailing 25,500 pounds (48% of the crop).

In this case, gross retail sales are projected at \$26,545.00. Container costs (Table 22) are shown as \$7710.00.

Other variables are marketing costs (Table 23) and include \$0.04 per pound advertising and \$0.32 per mile transportation costs.

Wholesaling costs of packing 27,500 pounds (52% of the crop) in drums is shown in Table 24; Projected wholesale sales are \$12,100.00, container costs are \$1,083.33.

Projected profit from total sales of \$38,645.00 is \$26,820.17 (Table 25). Notice that 62% of the profit is derived from retail sales and 38% from wholesale sales. Total retail sales is 69% of total sales.

The figures reveal that the majority of costs in the packing are for containers, 74% overall, and 77% and 60% for the retail and wholesale sides respectively. Advertising also takes up a large share as well, being 13% of overall costs.

Again, marketing costs are not incurred equally throughout the year. As a consequence, the figures in Table 26 show total costs and the months they are paid. These figures are projected in the cash flow for the first year of operation.

Table 22. Container Costs

Retail Container Size	Total lbs.	Number needed	Cost	Total cost of container	Price per Pound	Total Sales
60	12,000	200	\$4.00	\$800.00	\$0.95	\$11,400.00
5	4,000	800	\$1.80	\$1,440.00	\$0.98	\$3,920.00
2	3,500	1,750	\$1.00	\$1,750.00	\$1.15	\$4,025.00
1	6,000	6,000	\$0.62	\$3,720.00	\$1.20	\$7,200.00
Totals	25,500			\$7,710.00		\$26,545.00

Table 23. Marketing Costs

Retail Marketing Costs	Cost/lb of 25500 lbs	Cost/mile 2000 miles	Cost/hr 100 hrs	Total Cost
Advertising	\$0.04			\$1,020.00
Transportation		\$0.32		\$640.00
Operator labor			\$6.50	\$650.00
Total				\$2,310.00

Table 24. Wholesaling Costs

Wholesale Marketing Costs	Cost/lb of 27500 lbs	Cost/mile 300 miles	Hrs.	Cost/hr	Total Cost
Advertising	\$0.02				\$550.00
Transportation		\$0.32			\$96.00
Operator labor			10	\$6.50	\$65.00
Hired labor			4	\$3.50	\$10.00
Total					\$721.50

Table 25. Profit and Cost Analysis

Retail		<u>% Sales</u>	<u>% Retail Costs</u>
Total Retail Sales	\$26,545.00	69%	
Retail Container Costs	\$7,710.00		77%
Retail Advertising Costs	1020.00		10%
Retail Transport Costs	640.00		6%
Retail Hired Labor Costs	0.00		0%
Retail Operator Labor Costs	650.00		6%
Total Costs	\$10,020.00		
Retail Profit	\$16,525.00	62% Percent Total Profit	
Wholesale		<u>% Sales</u>	<u>% Costs</u>
Total Wholesale Sales	\$12,100.00	31%	
Wholesale Container Costs	\$1,083.33		60%
Wholesale Advertising Costs	550.00		30%
Wholesale Transport Costs	96.00		5%
Wholesale Hired Labor Costs	10.50		1%
Wholesale Operator Labor Costs	65.00	4%	
Total Costs	\$1,804.83		
Wholesale Profit	\$10,295.17	38% Percent Total Profit	
Total Sales	\$38,645.00		
Total Profit	\$26,820.17		<u>% Total Costs</u>
Total Retail Costs	\$10,020.00		85%
Total Wholesale Costs	\$1,804.83		15%
Retail and Wholesale Costs	\$11,824.83		100%

Table 26. Total Costs and Returns

			<u>% Cost</u>
Total container costs	\$8,793.33	Jul & Aug	74%
Total advertising costs	1,570.00	Sept & Oct	13%
Total transport costs	736.00	Oct & Nov	7%
Total hired labor costs	10.50	November	0%
Total operator labor costs	715.00	Dec & Jan	6%
Total Honey Return	\$38,645.00	Sept-Jan	100%
	<u>Lbs Cappings</u>	<u>Lbs Other</u>	<u>\$/lb</u>
Cappings	250		\$2.00
Other wax rendering		500	\$2.00
Total wax return (Oct & Nov)			\$1,500.00
Total return (honey and wax)			\$40,145.00

CASH FLOW

A positive cash flow over a long period of time is important, if a business is to survive. However, many operations, especially ones like beekeeping, can have widely fluctuating costs and returns over the year. This is the reason the present study attempts to estimate the time at which costs might be incurred and income gained.

Detailed examination of the cash flow statements in Tables 27 - 30 show income produced only five months out of the year (September through January). Costs, however, are incurred every month and vary from a high of \$6,767.78 in August to \$561.26 in February.

Use of a cash flow summary helps to separate out effects of debt retirement and operator labor. Some beekeepers prefer not to pay themselves first. Investment advisors discourage this practice, but it would eliminate this direct cost from the cash flow statement and thus, from those of direct cash costs and returns. Neither depreciation nor interest on capital investments are cash costs and as a consequence, are not figured into the cash flow statement.

The cash flow statement shows a negative balance at the end of the first year (\$22,331.98). This indicates that at least that much cash will be needed at some time during the year, if the business is to remain solvent. There is a positive cash flow of \$16,136.79, but this is before the beekeeper is paid (operator labor in the cash flow summary) and debt is retired. Debt retirement is a major factor in negative cash flow; it has been reduced from \$119,453.37 to \$89,559.48.

Table 27. Cash Flow Analysis for January thru March

Table 28. Cash Flow Analysis for April thru June

Table 29. Cash Flow Analysis for July thru September

Table 30. Cash Flow Analysis for October thru Year's End

SUMMARY OF COSTS AND RETURNS

Table 31 provides a summary of costs and returns pertaining to this operation. Analysis of cost percentages again reveals the part played by container expenses (18% of total costs). Depreciation represents 22% of total costs and Interest on the investment, 12%. Gross return over cash costs the first year is \$15,236.48, representing \$30.47 per colony and \$.28 per pound of honey produced. Return to investment, operator labor and management is \$4.53 per colony and \$.04 per pound of honey.

If operator labor is paid directly, the return is (\$9,539.81), or a loss of \$19.08 per colony and \$.17 per pound of honey produced. It is obvious from this analysis that the operation lost money its first year. This does not mean the business is a failure. Most beginning businesses lose money during the first few years of operation, especially if, as in this case, a substantial debt must be paid off.

Table 27. Cash Flow Analysis for January thru March

	January	February	March
CASH INFLOW			
Honey sales	\$7,729.00	\$0.00	\$0.00
Wax sales	0.00	0.00	0.00
Total Cash Inflow	\$7,729.00	\$0.00	\$0.00
CASH OUTFLOW			
Sugar	\$1,125.00	\$87.50	\$0.00
Drugs	27.00	0.00	0.00
Misc. expenses (production)	0.00	0.00	240.00
Hired labor (production)	134.75	18.08	319.67
Truck costs (production)	48.00	6.40	256.00
Containers	0.00	0.00	0.00
Queens	0.00	250.00	0.00
Repairs	103.44	103.44	103.44
Hired labor (packing)	0.00	0.00	0.00
Truck costs (packing)	0.00	0.00	0.00
Rent	33.33	33.33	33.33
Office supplies	12.50	12.50	12.50
Tools	16.67	16.67	16.67
Accounting service	0.00	0.00	0.00
Insurance	0.00	0.00	0.00
Real estate taxes	0.00	0.00	0.00
Advertising	0.00	0.00	0.00
Associations & Conventions	200.00	0.00	0.00
Heating, fuel	33.33	33.33	33.33
Total Cash Outflow	\$1,734.03	\$561.26	\$1,014.94
Total Cash Flow	\$5,994.97	(\$561.26)	(\$1,014.94)
CASH FLOW SUMMARY			
Net cash flow	\$5,994.97	(\$561.26)	(\$1,014.94)
+Beginning cash balance	100.00	2,876.85	(462.70)
-New capital investment	142,005.88	0.00	0.00
+Down payment (cash)	19,834.88	0.00	0.00
+New long-term borrowing	122,171.00	0.00	0.00
-Monthly long-term principal	1,495.92	1,510.88	1,525.98
-Long-term interest expense	1,221.71	1,206.75	1,191.64
-Operator labor (production)	500.50	60.67	593.67
-Operator labor (packing)	0.00	0.00	0.00
+Short-term borrowing	0.00	0.00	0.00
-Short-term principal	0.00	0.00	0.00
-Short-term interest expense	0.00	0.00	0.00
Ending Cash Balance	\$2,876.85	(\$462.70)	(\$4,788.94)
Accumulated Borrowings	\$119,453.37	\$116,735.75	\$114,018.12

Table 28. Cash Flow Analysis for April thru June

	April	May	June
CASH INFLOW			
Honey sales	\$0.00	\$0.00	\$0.00
Wax sales	0.00	0.00	0.00
Total Cash Inflow	\$0.00	\$0.00	\$0.00
CASH OUTFLOW			
Sugar	\$0.00	\$0.00	\$0.00
Drugs	0.00	0.00	0.00
Misc. expenses (production)	80.00	160.00	160.00
Hired labor (production)	345.33	465.50	157.50
Truck costs (production)	192.00	256.00	160.00
Containers	0.00	0.00	0.00
Queens	0.00	0.00	0.00
Repairs	103.44	103.44	103.44
Hired labor (packing)	0.00	0.00	0.00
Truck costs (packing)	0.00	0.00	0.00
Rent	33.33	33.33	33.33
Office supplies	12.50	12.50	12.50
Tools	16.67	16.67	16.67
Accounting service	0.00	0.00	0.00
Insurance	0.00	0.00	0.00
Real estate taxes	0.00	0.00	250.00
Advertising	0.00	0.00	0.00
Associations & Conventions	0.00	0.00	200.00
Heating, fuel	33.33	33.33	33.33
Total Cash Outflow	\$816.61	\$1,080.78	\$1,126.78
Total Cash Flow	(\$816.61)	(\$1,080.78)	(\$1,126.78)
CASH FLOW SUMMARY			
Net cash flow	(\$816.61)	(\$1,080.78)	(\$1,126.78)
+Beginning cash balance	(4,788.94)	(8,964.51)	(13,659.91)
-New capital investment	0.00	0.00	0.00
+Down payment (cash)	0.00	0.00	0.00
+New long-term borrowing	0.00	0.00	0.00
-Monthly long-term principal	1,541.24	1,556.66	1,572.22
-Long-term interest expense	1,176.38	1,160.97	1,145.40
-Operator labor (production)	641.33	897.00	260.00
-Operator labor (packing)	0.00	0.00	0.00
+Short-term borrowing	0.00	0.00	0.00
-Short-term principal	0.00	0.00	0.00
-Short-term interest expense	0.00	0.00	0.00
Ending Cash Balance	(\$8,964.51)	(\$13,659.91)	(\$17,764.31)
Accumulated Borrowings	\$111,300.49	\$108,582.87	\$105,865.24

Table 29. Cash Flow Analysis for July thru September

	July	August	September
CASH INFLOW			
Honey sales	\$0.00	\$0.00	\$7,729.00
Wax sales	0.00	0.00	0.00
Total Cash Inflow	0.00	0.00	\$7,729.00
CASH OUTFLOW			
Sugar	\$1,250.00	\$0.00	\$0.00
Drugs	0.00	680.00	0.00
Misc. expenses (production)	0.00	0.00	0.00
Hired labor (production)	7.00	145.83	10.50
Truck costs (production)	64.00	96.00	48.00
Containers	4,396.67	4,396.67	0.00
Queens	0.00	1,250.00	0.00
Repairs	103.44	103.44	103.44
Hired labor (packing)	0.00	0.00	0.00
Truck costs (packing)	0.00	0.00	0.00
Rent	33.33	33.33	33.33
Office supplies	12.50	12.50	12.50
Tools	16.67	16.67	16.67
Accounting service	0.00	0.00	0.00
Insurance	0.00	0.00	0.00
Real estate taxes	0.00	0.00	0.00
Advertising	0.00	0.00	785.00
Associations & Conventions	0.00	0.00	0.00
Heating, fuel	33.33	33.33	33.33
Total Cash Outflow	\$5,916.94	\$6,767.78	\$1,042.78
Total Cash Flow	(\$5,916.94)	(\$6,767.78)	\$6,686.22
CASH FLOW SUMMARY			
Net cash flow	(\$5,916.94)	(\$6,767.78)	\$6,686.22
+Beginning cash balance	(17,764.31)	(26,411.88)	(36,458.45)
-New capital investment	0.00	0.00	0.00
+Down payment (cash)	0.00	0.00	0.00
+New long-term borrowing	0.00	0.00	0.00
-Monthly long-term principal	1,587.95	1,603.82	1,619.86
-Long-term interest expense	1,129.68	1,113.80	1,097.76
-Operator labor (production)	13.00	561.17	154.92
-Operator labor (packing)	0.00	0.00	0.00
+Short-term borrowing	0.00	0.00	0.00
-Short-term principal	0.00	0.00	0.00
-Short-term interest expense	0.00	0.00	0.00
Ending Cash Balance	(\$26,411.88)	(\$36,458.45)	(\$32,644.77)
Accumulated Borrowings	\$103,147.62	\$100,429.99	\$97,712.36

Table 30. Cash Flow Analysis for October thru Year's End

	October	November	December	Year totals
CASH INFLOW				
Honey sales	\$7,729.00	\$7,729.00	\$7,729.00	\$38,645.00
Wax sales	750.00	750.00	0.00	\$1,500.00
Total Cash Inflow	\$8,479.00	\$8,479.00	\$7,729.00	\$40,145.00
CASH OUTFLOW				
Sugar	0.00	0.00	0.00	\$2,462.50
Drugs	0.00	0.00	0.00	\$707.00
Misc. expenses (production)	0.00	0.00	0.00	\$640.00
Hired labor (production)	350.00	350.00	0.00	\$2,304.17
Truck costs (production)	0.00	192.00	0.00	\$1,318.40
Containers	0.00	0.00	0.00	\$8,793.33
Queens	0.00	0.00	0.00	\$1,500.00
Repairs	103.44	103.44	103.44	\$1,241.31
Hired labor (packing)	0.00	10.50	0.00	\$10.50
Truck costs (packing)	368.00	368.00	0.00	\$736.00
Rent	33.33	33.33	33.33	\$400.00
Office supplies	12.50	12.50	12.50	\$150.00
Tools	16.67	16.67	16.67	\$200.00
Accounting service	0.00	87.50	87.50	\$175.00
Insurance	0.00	500.00	0.00	\$500.00
Real estate taxes	0.00	0.00	250.00	\$500.00
Advertising	785.00	0.00	0.00	\$1,570.00
Associations & Conventions	0.00	0.00	0.00	\$400.00
Heating, fuel	33.33	33.33	33.33	\$400.00
Total Cash Outflow	\$1,702.28	\$1,707.28	\$536.78	\$24,008.21
Total Cash Flow	\$6,776.72	\$6,771.72	\$7,192.22	\$16,136.79
CASH FLOW SUMMARY				
Net cash flow	\$6,776.72	\$6,771.72	\$7,192.22	\$16,136.79
+Beginning cash balance	(32,644.77)	(29,593.17)	(26,546.57)	(\$22,331.98)
-New capital investment	0.00	0.00	0.00	\$142,005.88
+Down payment (cash)	0.00	0.00	0.00	\$19,834.88
+New long-term borrowing	0.00	0.00	0.00	\$122,171.00
-Monthly long-term principal	1,636.06	1,652.42	1,668.95	\$18,971.96
-Long-term interest expense	1,081.56	1,065.20	1,048.68	\$13,639.55
-Operator labor (production)	650.00	650.00	260.00	\$5,242.25
-Operator labor (packing)	357.50	357.50	0.00	\$715.00
+Short-term borrowing	0.00	0.00	0.00	0.00
-Short-term principal	0.00	0.00	0.00	0.00
-Short-term interest expense	0.00	0.00	0.00	0.00
Ending Cash Balance	(\$29,593.17)	(\$26,546.57)	(\$22,331.98)	(\$22,331.98)
Accumulated Borrowings	\$94,994.74	\$92,277.11	\$89,559.48	\$89,559.48

Table 31. Summary of Costs and Returns

	Total Annual Costs	Percent of Total Cost	Per Hive	Per lb of Honey
COSTS				
Sugar	\$2,462.50	5%	\$4.93	\$0.04
Medication	707.00	1%	1.41	0.01
Hired labor (production)	2,304.17	5%	4.61	0.04
Truck costs (production)	1,318.40	3%	2.64	0.02
Containers	8,793.33	18%	17.59	0.16
Queens	1,500.00	3%	3.00	0.03
Repairs	1,241.31	2%	2.48	0.02
Truck costs (packing)	736.00	1%	1.47	0.01
Hired labor (packing)	10.50	0%	0.02	0.00
Rent	400.00	1%	0.80	0.01
Office supplies	150.00	0%	0.30	0.00
Tools	200.00	0%	0.40	0.00
Accounting service	175.00	0%	0.35	0.00
Real estate taxes	500.00	1%	1.00	0.01
Insurance, except trucks	500.00	1%	1.00	0.01
Advertising	1,570.00	3%	3.14	0.03
Associations & conven.	400.00	1%	0.80	0.01
Misc. Expenses (prod.)	640.00	1%	1.28	0.01
Heating, fuel	400.00	1%	0.80	0.01
Total operating capital	\$24,008.21	48%	\$48.02	\$0.44
Interest (operating cap.)	\$900.31	2%	\$1.80	\$0.02
TOTAL CASH COSTS	\$24,908.52	50%	\$49.82	\$0.45
Depreciation	12,973.88	26%	25.95	0.24
Interest on investment	5,845.16	12%	11.69	0.11
Operator labor (packing)	715.00	1%	1.43	0.01
Operator labor (prod.)	5,242.25	11%	10.48	0.10
TOTAL COSTS	\$49,684.81	100%	\$99.37	\$0.90
RETURNS				
Expected gross return	\$40,145.00	---	\$80.29	\$0.73
less total cash	24,908.52		49.82	0.45
Return over cash costs	15,236.48	---	30.47	0.28
less depreciation	12,973.88		25.95	0.24
Return to inv., operator labor and mgmt* (less interest)	2,262.60 5,845.16	---	4.53 11.69	0.04 0.11
Return to operator labor & mgmt (less operator labor)	(3,582.56) 5,957.25	---	(7.17) 11.91	(0.07) 0.11
Return to management	(\$9,539.81)	---	(\$19.08)	(\$0.17)
* Investment, operator labor and management				

ANALYSIS

Now that the model of a small-scale beekeeping enterprise has been constructed, some generalizations are in order about this particular operation. At the outset, it appears that the business is not profitable, because the return to management is in the red some

\$9000.00. However, there are extenuating circumstances that come into play. First, the business is paying off a heavy debt load; second the operator is receiving \$6.50 per hour for his/her labor. Assuming the family has other income, the loss could also be a significant tax shelter, while the beekeeping operation is becoming established.

An examination of investment costs shows that they could be reduced in a number of ways. The building could be rented, reduced in size or an old one purchased and renovated. Many beekeepers have little investment in excess land. Most beekeepers do not go into large-scale honey production with totally new equipment and bees. Thus, the possibility exists that land, hive and bee investments can be substantially reduced. Machinery and equipment investment may also be modified, depending on the operation. Any savings on investments, however, reduces depreciation possibilities. Quality investments are important for the business as it grows and their acquisition should be evaluated carefully.

Obviously, the amount of financing required for this operation is important to profitability. Anything reducing the amount of money that needs to be borrowed would improve profitability. This means a larger down payment or perhaps extending the payments beyond five years. Fluctuating interest rates are sure to remain important factors in the future. It is important to remember these investments are fixed costs and must be paid whether or not any honey is produced.

Variable costs in this operation could be examined carefully for savings opportunities. Analyzing expenses out in the bee yard provides insight into several savings possibilities. One is queen cost; this represents 11% total production outlay (notice this cost is for requeening only one-half the hives each year). One consideration is to rear ones own queens, another to find less-expensive providers of queen bees. Again, quality considerations take on prime importance here, for no colony is better than its queen. Sugar is another large cost (17% of total). The price varies considerably and substitutes such as high fructose corn syrup (HFCS) have recently been substantially less expensive. Because it is already in liquid form, HFCS also saves labor in mixing. However, it must be recognized that bees store HFCS more readily than food made from sucrose (table sugar) and thus the possibility of the resultant honey being declared illegally adulterated increases.

Operator labor is the largest variable production cost (37% in this example) and so must be looked at carefully in terms of cost reduction. As suggested before, any duties that can be done by hired labor, if it frees the operator up for more "important" work, should be carefully considered. As in many management situations, often the conventional wisdom of "do it yourself" is not the best. Hiring and

delegating duties in beekeeping seem to make eminent sense, but only studying their effects on the operation's economics will prove the point.

The concept of intensively managing bee colonies also comes into play when considering variable costs. Reducing the number of colonies, also potentially reduces bee yards and thus driving time. Spending more management time on one colony also qualifies as intensive activity. Most beekeepers agree more intensive colony management will pay greater dividends in the long run.

Beyond production costs, an in-depth analysis of returns in terms of honey and marketing costs can be extremely important. Much of the markup in agricultural produce occurs "beyond the farm gate," and the beekeeper should, therefore, position him or herself so as to take advantage of this. All too many sell their hard-won honey inexpensively to honey processors, who take advantage of markup. In this example, for instance, potential profit of \$16,525.00 is expected in the retail side of the operation (packing only 48% of honey produced). This is five times the profit expected from the wholesale side of the operation (packing 52% of the crop). It may be worthwhile then to look critically at advertising and promotion in the local market; there appears to exist a large potential profit in increasing efforts here with relatively little increased expense.

A significant amount of cost is represented by containers in both retail and wholesale sales; these costs should be examined carefully because they represent such a great percentage of possible profits. Labor, too, represents a significant part of marketing expense; the same considerations hold true here as for labor in the production side of the business.

Cash flow analysis in this study adds a significant dimension to the results presented here. It shows the relative importance of loan payments, as well as the ups and downs of income and disbursements throughout the year. It also helps to predict when short term borrowing might be essential to keep the business afloat, and reveals the critical need for working capital in starting operation. All too many businesses simply don't have enough working capital to carry them through the first few years, when a few dollars one way or another can spell success or disaster.

CAVEATS

This study is based on a number of assumptions; figures presented here are not in any sense a consensus, but rather best "guesses." Present and potential producers should not take them as absolutes. The value of the model lies not so much in the numbers printed here,, but in the fact that economic simulation with any set of figures is made possible with relative ease.

There are a number of ways to calculate interest on investments, for example, and some are quite complicated. Your attorney or tax consultant may not agree with how interest is figured here. The estimate of 106 pounds of honey per colony is just that, an estimate. Some would say that is high in Florida; another "arguable" figure is the number of hours of both operator and hired labor needed. And the list goes on: truck costs, driving time, packing costs and labor, and prevailing interest rates.

SIZE OF THE OPERATION

Although the model presented here is quite comprehensive, it does not reveal everything about a potential business. Perhaps one of the most elusive considerations in any endeavor is the effect of size, sometimes called economies of scale. The basic concept is that as size increases, so does efficiency. However, there is a limit to this; efficiency may in fact decrease due to limitations in any of several variables: labor, equipment, management, working capital, etc.

There is a noticeable lack of economic data on beekeeping operations in the United States, however, our Canadian neighbors have investigated several aspects of beekeeping economics, including effects of size. In a study from the Province of Alberta (1982) the following preface is published:

"As the size of the operation increases, cost savings can be expected in areas of operations and fixed investment components. For example, specialized bee equipment costs will be spread over a wider base as the number of hives increase. Operating cost savings can come about from the use of larger equipment, bulk buying, and more efficient use of labor and land. Lower production costs per pound of honey with increased size would result in increased returns to management."

One trend found in this study was a general decrease in return per pound of honey as the size of the operation increased. The average price received per pound of honey sold was 78.65 cents, 61.58 cents and 58.11 cents for operations with fewer than 100 hives, between 100 and 699 hives, and over 700 hives, respectively.

Investment costs per hive ranged from \$546.58 for apiaries with less than 10 hives, to a low of \$194.75 for operations with 700 to 999 hives. Operations with 1000 hives or more had significantly higher building and honey equipment costs (about 22 percent) when compared to those having 700 to 999 hives. This appears to be justified because of purchase of labor-saving devices such as forklifts and hive loaders.

Economies of size were most apparent for labor use in the Alberta study. Labor per pound ranged from 87.84 cents for operations with less than 10 hives to 13.97 cents for operations with 700 to 999 hives. Average vehicle expenses were 5.87 cents, 5.49 cents and 3.74 cents for operations with fewer than 100 hives, 100 to 699 hives, and over 700 hives, respectively. Building and repair costs also declined with size, as did operating costs.

The Alberta study indicated a positive return to management or profit was only seen in the 700 to 999 hive class and a positive return on investment was only realized by operations having 400 or more hives. In summary, 700 to 999 hive class operations has lowest investment costs, labor costs, operating costs and total production cost on a per pound of honey sold basis. In addition, the relatively high honey production of 151.04 pounds per hive yielded a profitable return to apiaries within this class.

Although the Canadian study suggests that economies of scale favor operations of 700 to 999 hives, that data must be tempered by present and future conditions in Florida. Unlike the prairie provinces of Canada, the Sunshine State is rapidly becoming urban with the concomitant problems of decrease in bee pasturage, increase in urban pesticide usage, and increase in potential for neighbor to neighbor conflicts resulting in beekeeping ordinances.

CONCLUSIONS

The financial model presented here can provide significant help to those contemplating a career in commercial beekeeping. It follows decision-making through investment costs, probable operating costs in the field as correlated with the Florida Beekeeping Almanac (1979), and costs and returns in marketing honey on a retail and wholesale basis.

The aim of this publication is to fill a void that has existed for sometime, by providing a guide to use in developing detailed financial analysis. The 1980s business climate demands a "sharper pencil." Fortunately, the decade has also provided an electronic sharpener in the form of the micro computer. Perhaps this easy-to-use simulation enable far more beekeepers to be able to say with some degree of assurance how much it costs them to produce a pound of honey.

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