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# The U.S. Beekeeping Industry

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**The U.S. Beekeeping Industry**. By Frederic L. Hoff, Commodity Economics Division, Economic Research Service, U.S. Department of Agriculture and Lois Schertz Willett, Department of Agricultural Economics, Cornell University. Agricultural Economic Report No. 680.

## Abstract

An estimated 125-150,000 beekeepers in the United States operate between 3.2 and 3.4 million honeybee colonies. Less than 2 percent of beekeepers are full-time (commercial) operators (300 or more colonies), more than 90 percent are hobbyists (fewer than 25 colonies), and the remainder are part-time (25-299 colonies). Honeybee pollination is vital to U.S. agriculture. Most pollination is provided free as a byproduct of honey production. In 1988, beekeepers derived 53 percent of their income from honey program payments. Total honey program payments have declined from $100 million in 1988 to $16 million in 1992. This report updates information on the beekeeping industry and its relationship to agriculture and the environment.

**Keywords:** Honey, pollination, production costs, beekeepers, price supports, marketing, grades

## Acknowledgments

The authors wish to thank the reviewers for their comments and suggestions: Bob Smith, Executive Director, National Honey Board; Jane K. Phillips, Agricultural Stabilization and Conservation Service, USDA; and Milton Ericksen, Lorna Aldrich, Glenn Zepp, and Boyd Buxton (all of the USDA's Economic Research Service).

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May 1994

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# Summary

U.S. agriculture needs honeybees to pollinate crops. For some crops, such as almonds, high concentrations of honeybees are needed for pollination to provide a commercial yield. Increased yields boost agricultural production and eventually reduce the cost of food to consumers. Honeybees also benefit home gardens, wildlife, and natural ecosystems.

Honeybee colonies in the United States peaked at 5.9 million in 1947, then declined to 4.1 million in 1972. From 1973 to 1981, colony numbers ranged between 4.1 and 4.3 million. Honey statistics were not reported by USDA from 1982 through 1985. Since the U.S. Department of Agriculture (USDA) resumed reporting honey statistics in 1986, the number of colonies operated by beekeepers with 5 or more colonies has ranged from 3 to 3.4 million. About 38 percent of the colonies are located in California, North Dakota, South Dakota, and Florida.

This report updates information on honey production, pollination, and the relationship of the U.S. beekeeping industry to agriculture and the environment. The study was mandated in the Committee report that accompanied the Agriculture, Rural Development, and Related Agencies Appropriation Act of 1987. The mandate resulted from concern by beekeepers and members of Congress about problems, issues, and challenges that emerged during the 1980's with the potential to significantly alter the beekeeping industry. These concerns included the northward migration of the Africanized honeybee, infestations of colonies by tracheal and Varroa mites, the widespread use of highly toxic pesticides, increasing honey imports, and efforts to discontinue the honey price support program.

The study draws from a national survey of honey producers, packers, importers, and brokers. Survey respondents included 688 producers, 112 packers, and 17 importers and/or brokers. Honey statistics published by the USDA are also presented.

The study found that only 22 percent of the 688 beekeepers surveyed received payment for pollination services during 1985-88. Beekeepers with pollination income had higher average receipts, expenses, and net income than beekeepers with no pollination income. Net income averaged $15.75 per colony (21 cents per pound) for beekeepers with pollination income, compared with $8.99 per colony (10 cents per pound) for beekeepers with no pollination income.

The honey price support program, established by the Agricultural Act of 1949, reduces market price uncertainty by establishing a loan rate for honey. The number of beekeepers using the program increased significantly in the mid-1980's, as the gap widened between the honey support price and the market price. About 85 percent of the beekeepers surveyed for this study used the honey program at least once during 1981-88. Nationwide, 15,386 loans were obtained by 5,028 honey producers for the 1990 honey crop. On October 21, 1993, Public Law 103-111 was signed which reduced the amount of payments and loan forfeitures to zero dollars for 1994 crop honey in fiscal 1994.

Government payments accounted for about one-fourth of the gross income reported for 1988 by the beekeepers surveyed and 53 percent of the gross income of beekeepers who participated in the honey program. Program users had higher average receipts, expenses, and net income than nonusers. The net incomes of program users averaged $13.20 per colony and 16 cents per pound of honey in 1988. The average net income for nonusers was $8.89 per colony and 11 cents per pound. Total honey program payments have declined in recent years, from $100 million in fiscal 1988 to $16 million in fiscal 1992.

Surveyed honey packers reported that the volume of foreign honey packed declined from 6.8 to 4 million pounds during 1986-88. The decline coincided with changes legislated for the honey price support program by the 1985 farm legislation, which reduced domestic honey prices, making domestic honey more price-competitive.

About half the beekeepers surveyed had losses of honeybees and honey due to drought, diseases, and mites during 1985-88. Thirty-five percent had losses from pesticides, and 80 percent had winter kill.

# The U.S. Beekeeping Industry

Frederic L. Hoff
Lois Schertz Willett

## Introduction

U.S. beekeepers confront a number of challenges and issues that are expected to alter the face of the industry before the end of the 20th century. The migration of the Africanized honeybee into the southern United States, the growing infestation of tracheal and Varroa mites, the use of certain toxic chemicals in honeybee foraging areas, increasing honey imports, and possible changes in the honey price support program may reduce the number of bees available for honey production and crop pollination and may change the way bees are managed.

These concerns prompted Congress to mandate a study of the state of the beekeeping industry. A report by the Committee on Appropriations that accompanied the Agriculture, Rural Development, and Related Agencies Appropriation Act of 1987 directed the U.S. Department of Agriculture's (USDA) Economic Research Service (ERS) to conduct a study of the U.S. honey industry to update existing information relative to honey production, pollination, and the relationship of the beekeeping industry to other segments of agriculture and the environment.

The study was initiated in early 1988 with the formulation of three cooperative research agreements between Cornell University and ERS. The primary objectives of these agreements were to: (1) analyze the value of honeybees as pollinators of agricultural crops, (2) evaluate the characteristics of the honey industry, and (3) estimate the effects of the Federal honey price-support program on honeybee pollination services. Data collected by Cornell University and the National Honey Board from a 1988 national survey of honey producers, packers, importers, and brokers provided the basis for the analysis. This report presents the findings from the 1988 honey industry survey and results from the analysis conducted under the cooperative research agreements (Willett, 1988, 1989, 1991, 1992a, 1992b, 1992c 1992d). Honey statistics published by USDA's National Agricultural Statistics Service (NASS) and Agricultural Stabilization and Conservation Service (ASCS) are also presented.

### 1988 Honey Industry Survey

The questions on the honey industry survey schedule appeared in five sections. The first section asked producers about their firm's characteristics, products, services, colony losses, and advertising and promotional activities. The second section asked honey packers questions about firm characteristics, products, services, and marketing activities. The third section asked similar questions of importers and brokers. The fourth part of the survey pertained to the firm's financial characteristics, and the respondent's demographic information was collected in the final section.

Some producers, packers, importers, and brokers did not respond to particular questions in the honey survey questionnaire. The sample size for different questions varies, consequently, according to the number of respondents and is noted on the figures and tables.

The survey was mailed on January 24, 1990, to a sample of 2,319 honey producers, packers, importers, and brokers who pay assessments to the National Honey Board. Over 52 percent of the questionnaires were returned, of which 817 contained adequate data for use in the analysis. Usable questionnaires were obtained for 688 producers, 112 packers, and 17 importers and/or brokers.

### Cooperative Research Agreements

The cooperative research agreements were established at Cornell University. Two of the agreements were with the Department of Agricultural Economics and one was with the Entomology Department. Both departments had faculty with the scientific and apiculture expertise needed for the research project.

## Structure of the U.S. Beekeeping Industry

Honeybees are believed to have been introduced into North America during early colonization. They were first recorded in Virginia around 1622 and spread

across the continent during the 1700's and 1800's. Today, bee culture is practiced throughout the United States in areas with widely different types of climate and flora. Beekeeping systems vary among geographic areas with different climates, flora, and farming systems.

Some beekeepers move their colonies annually from several miles to several thousand miles to provide pollination services or increase honey production by providing their bees with abundant sources of nectar. Beekeepers frequently collect fees for the pollination services they provide to fruit, vegetable, tree nut, field, and seed crops. In areas with abundant nectar-producing plants, some beekeepers specialize in honey production and move their colonies only occasionally. Beekeepers in warmer climates, such as California and the Southern States, may specialize in producing packaged bees and queens for stocking hives.

Peak labor needs for beekeepers usually occur when caring for the bees during the spring, when moving bees for pollination (commonly at night), and when harvesting and extracting honey. Beekeeping is not dependent on landownership; however, most beekeepers own a small acreage that serves as a base of operation.

There are few barriers to entry into beekeeping and honey processing. Nearly all States, however, employ county apiary inspectors who examine hives in the field to ensure that each apiary is free from diseases. State laws and regulations relating to honeybees and beekeeping are designed primarily to control bee diseases. Laws may regulate the movement of bee hives and the location of apiaries, require permits and certificates and inspections, impose quarantines, and specify methods of treating diseased colonies.

## Beekeeper Population

Beekeepers are classified as hobby (fewer than 25 hives), part-time or sideliner (25-299 hives), or full-time (commercial) producers (300 or more hives). There is a wide range of estimates regarding the actual number of beekeepers in the United States, however, since the Federal Government makes no official estimates. The International Trade Commission (ITC) reported in 1976 that the U.S. honey industry was comprised of 1,600 commercial beekeepers, 10,000 part-time beekeepers, and 200,000 hobbyists. The beekeeping industry has generally adopted these estimates as being plausible and continues to use them. The 1987 Census of Agriculture reported 38,625 farms with honeybee colonies, down from 46,833 in 1982.[1] The census estimate, however, does not include the majority of hobbyists and nonfarm resident beekeepers. The A. I. Root Company completed a survey of State apiary inspectors in May 1991 and reported in its publication *Gleanings in Bee Culture* that there are an estimated 139,061 beekeepers in the United States.

### *Hobbyist Beekeepers*

The beekeeping industry has a preponderance of small operators who keep honeybees as a hobby or for small-scale pollination of orchard and field crops. Most honey produced by hobbyists is consumed at home, given to friends and relatives, or distributed through local outlets. Many small producers do not operate honeybees primarily for profit nor are they necessarily concerned with production efficiency.

An estimated 90-95 percent of all beekeepers are hobbyists. Hobbyists and part-time beekeepers together account for about 99 percent of the beekeepers, half of the colonies, and 40 percent of the honey extracted (fig. 1).

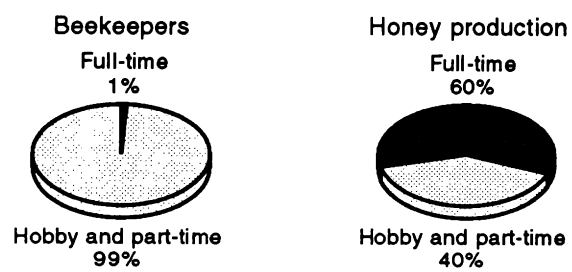
### *Part-time (Sideliner) Beekeepers*

Part-time beekeepers are classified as owners of 25-299 colonies. Units of this size are usually not large enough to employ a beekeeper full time, and beekeeping generally does not serve as the principal source of income. However, since part-time beekeepers sell the majority of their honey, they are more concerned with honey prices and production costs than are the hobbyists. There are an estimated 10,000 part-time beekeepers in the United States.

### *Full-time (Commercial) Beekeepers*

There are an estimated 1,600-2,000 full-time or commercial beekeepers, those owning 300 or more colonies. This group produces about 60 percent of the

Figure 1
**U.S. beekeepers and honey production, by firm type, 1975**




Source: U.S. International Trade Commission.

[1]A farm is defined as any place from which $1,000 or more of agricultural products were produced and sold or normally would have been sold during the census year.

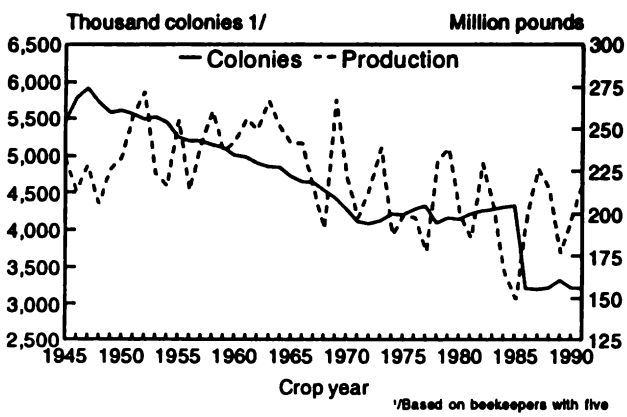
honey extracted. Full-time beekeepers can be divided into two groups: migratory and nonmigratory. Most full-time beekeepers relocate their bee colonies several times during the year to provide pollination services, reach more abundant sources of nectar, or to escape damage from pesticides. Migration allows beekeepers to extend the production season by providing their bees with a supply of nectar for a longer period. The nonmigratory beekeepers seldom move their colonies over significant distances. The colonies are normally left in the same location, summer and winter.

There is a small group of full-time beekeepers that specializes in the production of queens and packaged bees. These beekeepers sell packages of bees to other beekeepers to: (1) replace colonies killed or severely damaged in the fall and winter in northern areas; (2) strengthen colonies weakened by overwintering, diseases, or pesticides; and (3) stock new colonies. The majority of packaged bees and queens are shipped in March, April, and May to beekeepers throughout the United States.

### Colony Numbers

The number of honeybee colonies in the United States peaked at 5.9 million in 1947 (fig. 2). The beekeeping industry experienced a large increase in colony numbers during World War II because honey was needed to substitute for rationed sugar. Also, beeswax was being used instead of petroleum products to waterproof ammunition and other war equipment. To meet these critical war needs, the Government gave high priority to providing beekeepers with the scarce materials needed to expand their production capacity.

Figure 2
**U.S. honeybee colonies and production, 1945-92**




Source: NASS & ASCS, USDA.

1/Based on beekeepers with five or more colonies after 1985.

After the war, colony numbers began to drop and continued their decline even after Congress legislated a honey price-support program in the Agricultural Act of 1949. USDA estimates of the number of colonies declined gradually from 5.9 million in 1947 to 4.1 million in 1972 (table 1). From 1973 until 1985, colony numbers ranged between 4.1 and 4.3 million. Although official estimates of colony numbers were not reported for the 1982-85 crop years, USDA's Agricultural Stabilization and Conservation Service (ASCS) estimated colony numbers to average around 4.3 million.

The National Agricultural Statistics Service (NASS) estimates 3-3.4 million colonies of honeybees in the United States from 1986 to 1992 in apiaries with five or more colonies. These estimates are not comparable with those prior to 1986, however, because the earlier numbers included bees in apiaries with fewer than five colonies. If apiaries with fewer than five colonies are counted, the current number of colonies would likely be similar to the numbers reported prior to 1986.

More than a third of all colonies in the United States are located in California, North Dakota, South Dakota, and Florida. California alone reported 520,000 colonies in 1991 (table 2).

### Honey and Beeswax Production

U.S. honey production declined between the 1950's and the 1980's, coinciding closely with the decline in colony numbers. Production ranged from a peak of 272 million pounds in 1952 to 150 million pounds in 1985.

During the 1950's and 1960's, production averaged 240 million pounds a year but fell to 211 million pounds for the 1970's. Although honey production averaged only 195 million pounds during the 1980's, production potential probably has not changed very much since the 1970's. If the weather-reduced crops of 1984, 1985, and 1989 are excluded, honey production averaged 209 million pounds during 1980-89.

U.S. production of honey varies widely among regions and from year to year, depending on rainfall, soil conditions, temperature, cropping patterns, management, and various other environmental factors. Cold and rainy weather can prevent bees from collecting nectar, which reduces honey production. Rain, drought, or freezing temperatures can also cut honey production by damaging nectar sources.

**Table 1—Colonies of honeybees, honey and beeswax production, and yield per colony, United States, 1945-92 crop years**

| Crop year | Colonies | Honey production | | | Beeswax production | | |
|---|---|---|---|---|---|---|---|
| | | Yield per colony | Quantity | Value[1] | Yield per colony | Quantity | Value[2] |
| | *Thousands* | *Pounds* | *Million pounds* | *Million dollars* | *Pounds* | *Million pounds* | *Million dollars* |
| 1945 | 5,460 | 42.7 | 233.1 | 43.4 | 0.82 | 4.5 | 1.9 |
| 1946 | 5,787 | 36.9 | 213.8 | 52.2 | 0.76 | 4.4 | 2.0 |
| 1947 | 5,916 | 38.6 | 228.6 | 56.9 | 0.76 | 4.5 | 2.0 |
| 1948 | 5,724 | 36.0 | 206.3 | 36.9 | 0.70 | 4.0 | 1.7 |
| 1949 | 5,578 | 40.6 | 226.3 | 33.9 | 0.73 | 4.1 | 1.5 |
| 1950 | 5,612 | 41.5 | 233.0 | 35.6 | 0.77 | 4.3 | 1.8 |
| 1951 | 5,559 | 46.4 | 258.1 | 41.2 | 0.85 | 4.7 | 2.4 |
| 1952 | 5,493 | 49.5 | 272.0 | 44.1 | 0.87 | 4.8 | 2.1 |
| 1953 | 5,520 | 40.5 | 223.8 | 36.9 | 0.74 | 4.1 | 1.7 |
| 1954 | 5,451 | 39.7 | 216.4 | 36.9 | 0.73 | 4.0 | 1.8 |
| 1955 | 5,252 | 48.6 | 255.2 | 45.4 | 0.88 | 4.6 | 2.4 |
| 1956 | 5,195 | 41.2 | 214.0 | 40.7 | 0.79 | 4.1 | 2.2 |
| 1957 | 5,199 | 46.4 | 241.2 | 45.1 | 0.87 | 4.5 | 2.6 |
| 1958 | 5,152 | 50.6 | 260.5 | 45.3 | 0.91 | 4.7 | 2.2 |
| 1959 | 5,109 | 46.3 | 236.6 | 40.2 | 0.82 | 4.2 | 1.9 |
| 1960 | 5,005 | 48.5 | 242.8 | 43.5 | 0.88 | 4.4 | 1.9 |
| 1961 | 4,992 | 51.3 | 255.9 | 46.1 | 0.94 | 4.7 | 2.1 |
| 1962 | 4,900 | 50.9 | 249.6 | 43.4 | 0.98 | 4.8 | 2.1 |
| 1963 | 4,849 | 55.0 | 266.8 | 48.0 | 0.99 | 4.8 | 2.1 |
| 1964 | 4,840 | 51.9 | 251.2 | 46.7 | 0.97 | 4.7 | 2.1 |
| 1965 | 4,718 | 51.3 | 241.8 | 43.0 | 1.00 | 4.7 | 2.1 |
| 1966 | 4,646 | 52.0 | 241.6 | 42.0 | 0.99 | 4.6 | 2.1 |
| 1967 | 4,635 | 46.6 | 215.8 | 33.7 | 0.95 | 4.4 | 2.6 |
| 1968 | 4,539 | 42.2 | 191.4 | 32.3 | 0.84 | 3.8 | 2.3 |
| 1969 | 4,433 | 60.3 | 267.5 | 46.8 | 1.17 | 5.2 | 3.2 |
| 1970 | 4,285 | 51.7 | 221.7 | 38.6 | 1.03 | 4.4 | 2.6 |
| 1971 | 4,107 | 48.2 | 197.8 | 43.1 | 0.88 | 3.6 | 2.2 |
| 1972 | 4,085 | 52.8 | 215.6 | 65.1 | 0.98 | 4.0 | 2.5 |
| 1973 | 4,124 | 58.0 | 239.1 | 106.1 | 1.04 | 4.3 | 3.2 |
| 1974 | 4,210 | 44.6 | 187.9 | 95.8 | 0.83 | 3.5 | 4.0 |
| 1975 | 4,206 | 47.4 | 199.2 | 100.6 | 0.81 | 3.4 | 3.5 |
| 1976 | 4,269 | 46.4 | 198.0 | 98.8 | 0.79 | 3.4 | 3.4 |
| 1977 | 4,323 | 41.2 | 178.1 | 94.3 | 0.71 | 3.1 | 4.9 |
| 1978 | 4,090 | 56.6 | 231.5 | 126.5 | 0.96 | 3.9 | 6.8 |
| 1979 | 4,163 | 57.3 | 238.7 | 141.5 | 0.91 | 3.8 | 6.7 |
| 1980 | 4,141 | 48.2 | 199.8 | 122.8 | 0.94 | 3.9 | 7.1 |
| 1981 | 4,213 | 44.1 | 185.9 | 117.6 | 0.87 | 3.7 | 7.1 |
| 1982[3] | 4,250 | 54.1 | 230.0 | NA | NA | NA | NA |
| 1983[3] | 4,275 | 48.0 | 205.0 | NA | NA | NA | NA |
| 1984[3] | 4,300 | 38.4 | 165.1 | NA | NA | NA | NA |
| 1985[3] | 4,325 | 34.7 | 150.1 | NA | NA | NA | NA |
| 1986[4] | 3,205 | 62.5 | 200.4 | 102.7 | NA | NA | NA |
| 1987[4] | 3,190 | 71.1 | 226.8 | 113.7 | NA | NA | NA |
| 1988[4] | 3,219 | 66.3 | 214.1 | 108.0 | NA | NA | NA |
| 1989[4] | 3,443 | 51.4 | 177.0 | 89.4 | NA | NA | NA |
| 1990[4] | 3,210 | 61.6 | 197.8 | 107.7 | NA | NA | NA |
| 1991[4] | 3,200 | 68.9 | 219.2 | 121.9 | NA | NA | NA |
| 1992[4] | 3,030 | 72.8 | 220.6 | 123.1 | NA | NA | NA |

NA = Not available.

[1]Represents the quantity of honey produced multiplied by the price of all domestic honey (table 3) for 1945-71 and 1982-85 and estimates by NASS, USDA, for 1972-81 and 1986-92.

[2]Represents the quantity of beeswax produced multiplied by the average price of beeswax (table 3).

[3]Data not reported by NASS, USDA. Estimated by ASCS, USDA.

[4]NASS,USDA, reinstated annual reporting of honey data. Data now based on beekeepers with five or more colonies.

Sources: National Agricultural Statistics Service (NASS) and Agricultural Stabilization and Conservation Service (ASCS), USDA.

**Table 2--Colony numbers, yield per colony, and honey production, by State, 1986-92 crop years [1]**

| State | Number of colonies | | | | | | | Yield per colony | | | | | | | Honey production | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
| | *Thousands* | | | | | | | *Pounds* | | | | | | | *Thousand pounds* | | | | | | |
| Alabama | 41 | 46 | 42 | 41 | 29 | 23 | 25 | 42 | 35 | 42 | 20 | 38 | 24 | 41 | 1,722 | 1,610 | 1,764 | 820 | 1,102 | 552 | 1,025 |
| Arizona | 77 | 73 | 73 | 78 | 67 | 75 | 70 | 50 | 47 | 49 | 45 | 48 | 50 | 54 | 3,850 | 3,431 | 3,577 | 3,510 | 3,216 | 3,750 | 3,780 |
| Arkansas | 21 | 29 | 34 | 34 | 42 | 47 | 45 | 64 | 69 | 67 | 61 | 84 | 79 | 65 | 1,344 | 2,001 | 2,278 | 2,074 | 3,528 | 3,713 | 2,925 |
| California | 520 | 500 | 520 | 560 | 480 | 520 | 470 | 52 | 33 | 40 | 34 | 42 | 63 | 67 | 27,040 | 16,500 | 20,800 | 19,040 | 20,160 | 32,760 | 31,490 |
| Colorado | 41 | 44 | 48 | 50 | 55 | 50 | 52 | 78 | 73 | 83 | 66 | 64 | 79 | 74 | 3,198 | 3,212 | 3,984 | 3,300 | 3,520 | 3,950 | 3,848 |
| Connecticut | 3 | 2 | 2 | 2 | 2 | [2] | [2] | 20 | 34 | 46 | 40 | 52 | [2] | [2] | 60 | 68 | 92 | 80 | 104 | [2] | [2] |
| Delaware | 1 | 1 | 1 | 1 | 1 | [2] | [2] | 25 | 29 | 26 | 10 | 11 | [2] | [2] | 25 | 29 | 26 | 10 | 11 | [2] | [2] |
| Florida | 290 | 240 | 240 | 250 | 220 | 225 | 220 | 75 | 79 | 105 | 60 | 95 | 83 | 104 | 21,750 | 18,960 | 25,200 | 15,000 | 20,900 | 18,675 | 22,880 |
| Georgia | 115 | 120 | 115 | 116 | 111 | 102 | 85 | 41 | 38 | 41 | 27 | 50 | 42 | 55 | 4,715 | 4,560 | 4,715 | 3,132 | 5,550 | 4,284 | 4,675 |
| Hawaii | 9 | 9 | 9 | 9 | 10 | 10 | 9 | 147 | 190 | 179 | 135 | 157 | 131 | 138 | 1,323 | 1,710 | 1,611 | 1,215 | 1,570 | 1,310 | 1,242 |
| Idaho | 100 | 105 | 112 | 140 | 140 | 140 | 135 | 45 | 60 | 53 | 54 | 40 | 46 | 51 | 4,500 | 6,300 | 5,936 | 7,560 | 5,600 | 6,440 | 6,885 |
| Illinois | 30 | 28 | 28 | 29 | 23 | 21 | 16 | 27 | 75 | 69 | 38 | 40 | 52 | 53 | 810 | 2,100 | 1,932 | 1,102 | 920 | 1,092 | 848 |
| Indiana | 27 | 25 | 29 | 28 | 22 | 21 | 15 | 23 | 58 | 65 | 35 | 47 | 50 | 31 | 621 | 1,450 | 1,885 | 980 | 1,034 | 1,050 | 465 |
| Iowa | 40 | 44 | 49 | 67 | 70 | 70 | 65 | 59 | 103 | 129 | 90 | 54 | 59 | 62 | 2,360 | 4,532 | 6,321 | 6,030 | 3,780 | 4,130 | 4,030 |
| Kansas | 47 | 46 | 42 | 37 | 36 | 35 | 28 | 85 | 51 | 69 | 46 | 67 | 52 | 58 | 3,995 | 2,346 | 2,898 | 1,702 | 2,412 | 1,820 | 1,624 |
| Kentucky | 15 | 14 | 12 | 12 | 8 | 7 | 4 | 15 | 25 | 40 | 29 | 44 | 25 | 30 | 225 | 350 | 480 | 348 | 352 | 175 | 120 |
| Louisiana | 35 | 35 | 38 | 35 | 38 | 40 | 45 | 58 | 75 | 90 | 85 | 89 | 70 | 107 | 2,030 | 2,625 | 3,420 | 2,975 | 3,382 | 2,800 | 4,815 |
| Maine | 9 | 9 | 14 | 17 | 20 | 13 | 15 | 17 | 46 | 26 | 24 | 24 | 42 | 22 | 153 | 414 | 364 | 408 | 480 | 546 | 330 |
| Maryland | 8 | 7 | 7 | 9 | 7 | 7 | 6 | 28 | 35 | 25 | 16 | 19 | 25 | 23 | 224 | 245 | 175 | 144 | 133 | 175 | 138 |
| Massachusetts | 10 | 11 | 15 | 8 | 15 | [2] | [2] | 15 | 15 | 18 | 23 | 13 | [2] | [2] | 150 | 165 | 270 | 184 | 195 | [2] | [2] |
| Michigan | 80 | 80 | 95 | 102 | 100 | 105 | 95 | 56 | 68 | 73 | 70 | 80 | 73 | 68 | 4,480 | 5,440 | 6,935 | 7,140 | 8,000 | 7,665 | 6,460 |
| Minnesota | 136 | 150 | 150 | 165 | 170 | 180 | 190 | 78 | 108 | 129 | 92 | 74 | 91 | 90 | 10,608 | 16,200 | 19,350 | 15,180 | 12,580 | 16,380 | 17,100 |
| Mississippi | 23 | 19 | 21 | 24 | 24 | 28 | 25 | 54 | 60 | 66 | 33 | 62 | 36 | 65 | 1,242 | 1,140 | 1,386 | 792 | 1,488 | 1,008 | 1,625 |
| Missouri | 30 | 30 | 30 | 33 | 30 | 28 | 25 | 53 | 65 | 80 | 62 | 63 | 65 | 77 | 1,590 | 1,950 | 2,400 | 2,046 | 1,890 | 1,820 | 1,925 |
| Montana | 110 | 95 | 105 | 100 | 98 | 86 | 87 | 64 | 102 | 48 | 63 | 81 | 92 | 110 | 7,040 | 9,690 | 5,040 | 6,300 | 7,938 | 7,912 | 9,570 |
| Nebraska | 100 | 120 | 113 | 119 | 118 | 108 | 96 | 76 | 92 | 96 | 62 | 56 | 67 | 75 | 7,600 | 11,040 | 10,848 | 7,378 | 6,608 | 7,236 | 7,200 |
| Nevada | 9 | 11 | 9 | 15 | 17 | 15 | 15 | 40 | 30 | 30 | 54 | 58 | 54 | 65 | 360 | 330 | 270 | 810 | 986 | 810 | 975 |
| New Hampshire | 1 | 1 | 1 | 1 | 1 | [2] | [2] | 14 | 32 | 34 | 35 | 54 | [2] | [2] | 14 | 32 | 34 | 35 | 54 | [2] | [2] |
| New Jersey | 16 | 25 | 30 | 25 | 15 | 11 | 8 | 30 | 34 | 31 | 23 | 21 | 31 | 22 | 480 | 850 | 930 | 575 | 315 | 341 | 176 |
| New Mexico | 19 | 19 | 21 | 23 | 29 | 20 | 18 | 63 | 50 | 57 | 50 | 71 | 77 | 68 | 1,197 | 950 | 1,197 | 1,150 | 2,059 | 1,540 | 1,224 |
| New York | 92 | 90 | 94 | 94 | 81 | 77 | 70 | 32 | 44 | 59 | 59 | 54 | 62 | 66 | 2,944 | 3,960 | 5,546 | 5,546 | 4,374 | 4,774 | 4,620 |
| North Carolina | 18 | 20 | 21 | 25 | 20 | 18 | 15 | 30 | 48 | 46 | 38 | 50 | 58 | 45 | 540 | 960 | 966 | 950 | 1,000 | 1,044 | 675 |
| North Dakota | 290 | 280 | 230 | 290 | 210 | 215 | 240 | 107 | 110 | 66 | 56 | 82 | 103 | 91 | 31,030 | 30,800 | 15,180 | 16,240 | 17,220 | 22,145 | 21,840 |
| Ohio | 59 | 55 | 50 | 53 | 42 | 48 | 43 | 26 | 50 | 48 | 20 | 51 | 61 | 33 | 1,534 | 2,750 | 2,400 | 1,060 | 2,142 | 2,928 | 1,419 |
| Oklahoma | 15 | 10 | 10 | 9 | 9 | 9 | 9 | 48 | 70 | 55 | 65 | 50 | 70 | 52 | 720 | 700 | 550 | 585 | 450 | 630 | 468 |
| Oregon | 59 | 55 | 60 | 63 | 61 | 56 | 52 | 43 | 42 | 52 | 39 | 42 | 46 | 49 | 2,537 | 2,310 | 3,120 | 2,457 | 2,562 | 2,576 | 2,548 |
| Pennsylvania | 50 | 48 | 45 | 41 | 41 | 40 | 30 | 32 | 39 | 46 | 39 | 28 | 45 | 41 | 1,600 | 1,872 | 2,070 | 1,599 | 1,148 | 1,800 | 1,230 |
| Rhode Island | 1 | 1 | 1 | 1 | 1 | [2] | [2] | 15 | 32 | 39 | 39 | 31 | [2] | [2] | 15 | 32 | 39 | 39 | 31 | [2] | [2] |
| South Carolina | 15 | 15 | 14 | 15 | 12 | 11 | 11 | 25 | 34 | 40 | 19 | 41 | 61 | 69 | 375 | 510 | 560 | 285 | 492 | 671 | 759 |
| South Dakota | 201 | 250 | 245 | 230 | 245 | 225 | 240 | 113 | 134 | 74 | 49 | 81 | 101 | 85 | 22,713 | 33,500 | 18,130 | 11,270 | 19,845 | 22,725 | 20,400 |
| Tennessee | 36 | 35 | 35 | 25 | 19 | 14 | 7 | 32 | 55 | 40 | 25 | 33 | 38 | 43 | 1,152 | 1,925 | 1,400 | 625 | 627 | 532 | 301 |
| Texas | 117 | 110 | 114 | 140 | 140 | 140 | 125 | 62 | 74 | 76 | 56 | 67 | 78 | 85 | 7,254 | 8,140 | 8,664 | 7,840 | 9,380 | 10,920 | 10,625 |
| Utah | 35 | 35 | 36 | 47 | 47 | 45 | 47 | 45 | 48 | 41 | 44 | 37 | 34 | 56 | 1,575 | 1,688 | 1,476 | 2,068 | 1,739 | 1,530 | 2,632 |
| Vermont | 7 | 7 | 7 | 6 | 6 | 6 | 6 | 17 | 46 | 51 | 61 | 65 | 75 | 63 | 119 | 322 | 357 | 366 | 390 | 450 | 378 |
| Virginia | 30 | 25 | 25 | 23 | 16 | 16 | 13 | 38 | 48 | 56 | 20 | 34 | 33 | 38 | 1,140 | 1,200 | 1,400 | 460 | 544 | 528 | 494 |
| Washington | 75 | 75 | 65 | 70 | 80 | 85 | 80 | 48 | 55 | 47 | 46 | 55 | 42 | 44 | 3,600 | 4,125 | 3,055 | 3,220 | 4,400 | 3,570 | 3,520 |
| West Virginia | 17 | 21 | 30 | 32 | 30 | 26 | 23 | 30 | 41 | 35 | 44 | 30 | 24 | 55 | 510 | 861 | 1,050 | 1,408 | 900 | 624 | 1,265 |
| Wisconsin | 85 | 83 | 93 | 108 | 112 | 110 | 105 | 50 | 97 | 99 | 74 | 75 | 67 | 66 | 4,250 | 8,051 | 9,207 | 7,992 | 8,400 | 7,370 | 6,930 |
| Wyoming | 40 | 37 | 39 | 41 | 40 | 41 | 41 | 52 | 78 | 73 | 47 | 57 | 52 | 70 | 2,080 | 2,886 | 2,847 | 1,927 | 2,280 | 2,132 | 2,870 |
| Other States | | | | | | 12 | 9 | | | | | | 21 | 26 | | | | | | 252 | 234 |
| United States | 3,205 | 3,190 | 3,219 | 3,443 | 3,210 | 3,181 | 3,030 | 62.5 | 71.1 | 66.3 | 51.4 | 61.6 | 68.8 | 72.8 | 200,394 | 226,822 | 214,135 | 176,957 | 197,791 | 219,171 | 220,584 |

[1] Data based on beekeepers with five or more colonies.
[2] Not reported separately to avoid disclosing data for individual operations.

Source: National Agricultural Statistics Service, USDA.

The U.S. beekeeping industry is divided into five regions for this report.[2] Beekeeping practices tend to be comparable within regions because of similar floral sources and climate.

The Northwest produced over a third of the domestic honey during 1986-91 (fig. 3). North Dakota, South Dakota, California, and Florida were the major producing States, accounting for 42 percent of total output.

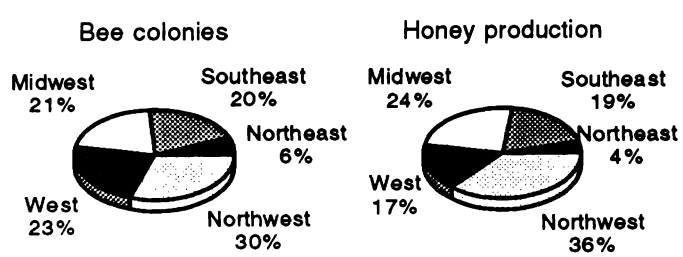
Average honey yields per colony vary widely among States, ranging from 138 pounds in Hawaii to 22 pounds in New Jersey and Maine during 1992. The average yields during 1986-92 for North and South Dakota, the major honey-producers, ranged from 56-110 pounds and 49-134 pounds, respectively. U.S. average yields ranged from 51.4 to 72.8 pounds per colony between 1986 and 1992.

### Value of Production

The value of honey production ranged from $32.3 million to $56.9 million during 1945-71, averaging $42.3 million. Decreased honey production in 1970 and 1971 resulted in depletion of domestic honey stocks, boosting prices and causing the value to jump sharply to $65.1 million in 1972 and $106.1 million in 1973. The average price of all domestic honey trended upward from 17.4 cents per pound in 1970 to a record 63.2 cents per pound in 1981 (table 3). After 1981, the average price declined to around 50 cents per pound in 1989. Since 1989, honey prices have been strengthening, increasing from 53.7 cents a pound in 1990 to 55.8 cents in 1992.

[2]The regions are: Northeast (CT, MA, MD, ME, NH, NJ, PA, VT, DE, and RI); Southeast (AL, AR, GA, FL, LA, MO, MS, NC, SC, TN, VA, WV); Midwest (IA, IL, IN, KS, KY, MI, MN, OH WI, OK, TX); West (AZ, CO, CA, NM, NV, UT, WY, HI); and Northwest (AK, ID, MT, ND, NE, OR, SD, WA).

Figure 3
**Honeybee colonies and honey production, by region, 1986-90 average**




Source: NASS, USDA.

### Processing, Packing, and Storing

Honey maintains its peak quality when stored in the comb. Processing methods and storage conditions following its removal from the comb determine honey's quality when consumed.

#### *Processing*

The processing of most honey begins with extraction, which involves removing the capping from the comb cells, using centrifugal force to remove the honey from the comb, and separating the honey from the larger wax particles and other foreign material. Extraction usually is performed by the producer.

Further processing involves holding in settling tanks and straining to remove the finer, suspended impurities so the honey will meet desired grade requirements. The processing of honey may be done by the producer, a packer, or both.

#### *Packing and Storage*

Packing involves placing the honey in containers for sale to another packer, a dealer, or to the retail market. The packing segment of the industry is composed of a relatively small number of firms, most of which buy processed honey for resale.

Honey is sold in liquid, creamed, comb, cut comb, and chunk form. Glass or plastic containers are the most popular material for packing and selling honey in retail markets. Honey marketed in bulk is generally packed in 60-pound cans, 55-gallon drums, totes, or tankers. Few changes have occurred in honey packaging during the past two decades.

Honey can be stored for years, under proper conditions of temperature and humidity, without serious deterioration in color, flavor and aroma.

## Characteristics of Beekeeping Firms

### Beekeepers

Of the beekeepers completing the survey, 42 percent were classified as full-time, 44 percent part-time, and 14 percent hobbyists. The full-time beekeepers accounted for 93 percent of the bee colonies and 94 percent of the honey production.

**Table 3–Honey and beeswax prices and price support loan rates, 1950-92**

| Crop year | Honey prices: Domestic average, all honey | Honey prices: Import value, all honey[1] | Honey prices: National average price support rate[2] | Honey prices: Parity price, adjusted | Beeswax prices: Domestic average |
|---|---|---|---|---|---|
| | | | *Cents/pound* | | |
| 1950 | 15.3 | 5.9 | 9.0 | 15.0 | 42.8 |
| 1951 [3] | 16.0 | 8.1 | 10.0 | 16.7 | 50.4 |
| 1952 | 16.2 | 8.5 | 11.4 | 16.3 | 43.1 |
| 1953 | 16.5 | 8.8 | 10.5 | 15.0 | 41.0 |
| 1954 | 17.0 | 9.2 | 10.2 | 17.0 | 44.1 |
| 1955 | 17.8 | 10.5 | 9.9 | 13.2 | 51.2 |
| 1956 | 19.0 | 13.0 | 9.7 | 13.9 | 54.6 |
| 1957 | 18.7 | 12.6 | 9.7 | 13.9 | 57.0 |
| 1958 | 17.4 | 11.1 | 9.6 | 13.7 | 46.0 |
| 1959 | 17.0 | 9.7 | 8.3 | 13.8 | 44.4 |
| 1960 | 17.9 | 9.9 | 8.6 | 14.3 | 44.0 |
| 1961 | 18.0 | 11.7 | 11.2 | 14.9 | 44.1 |
| 1962 | 17.4 | 11.0 | 11.2 | 15.1 | 44.1 |
| 1963 | 18.0 | 15.2 | 11.2 | 16.7 | 44.2 |
| 1964 | 18.6 | 13.8 | 11.2 | 17.2 | 44.3 |
| 1965 | 17.8 | 10.0 | 11.2 | 17.8 | 44.9 |
| 1966 | 17.4 | 11.2 | 11.4 | 18.6 | 46.5 |
| 1967 | 15.6 | 9.7 | 12.5 | 19.5 | 58.8 |
| 1968 | 16.9 | 10.3 | 12.5 | 18.7 | 61.6 |
| 1969 | 17.5 | 10.7 | 13.0 | 19.5 | 61.1 |
| 1970 | 17.4 | 12.5 | 13.0 | 20.4 | 60.2 |
| 1971 | 21.8 | 15.1 | 14.0 | 21.0 | 61.3 |
| 1972 | 30.2 | 22.8 | 14.0 | 22.3 | 62.1 |
| 1973 | 44.4 | 35.4 | 16.1 | 26.7 | 74.4 |
| 1974 | 51.0 | 40.6 | 20.6 | 34.3 | 114.0 |
| 1975 | 50.5 | 34.9 | 25.5 | 42.4 | 103.0 |
| 1976 | 49.9 | 31.0 | 29.4 | 49.0 | 112.0 |
| 1977 | 53.0 | 30.8 | 32.7 | 54.4 | 158.0 |
| 1978 | 54.5 | 34.5 | 36.8 | 61.3 | 174.0 |
| 1979 | 59.0 | 38.9 | 43.9 | 73.1 | 175.0 |
| 1980 | 61.4 | 43.0 | 50.3 | 83.9 | 183.0 |
| 1981 | 63.2 | 41.6 | 57.4 | 95.6 | 191.0 |
| 1982 | 56.8 [4] | 40.5 | 60.4 | 100.7 | NA |
| 1983 | 54.4 [4] | 39.5 | 62.2 | 103.7 | NA |
| 1984 | 50.0 [4] | 37.2 | 65.8 | 109.7 | NA |
| 1985 | 47.5 [4] | 33.0 | 65.3 | 108.7 | NA |
| 1986 [5] | 51.3 | 36.1 | 64.0 | 109.0 [7] | NA |
| 1987 [5] | 50.3 | 35.6 | 61.0 [6] | 106.0 [7] | NA |
| 1988 [5] | 50.0 | 34.2 | 59.1 | 111.0 [7] | NA |
| 1989 [5] | 49.8 | 36.4 | 56.4 | 114.0 [7] | NA |
| 1990 [5] | 53.7 | 39.3 | 53.8 | 115.0 [7] | NA |
| 1991 [5] | 55.6 | 43.2 | 53.8 | NA | NA |
| 1992 [5] | 55.8 | 42.6 | 53.8 | NA | NA |

NA = Data not available.

[1]Represents the total value of honey imports divided by the total quantity imported.

[2]For extracted honey in 60-pound or larger containers.

[3] On March 22, 1951, support for most flavors of honey was announced at 10 cents per pound, with a dozen flavors of limited domestic acceptability supported at 9 cents. On April 5, 1951, it was announced that the support price of honey that was widely acceptable for table use would be increased from 10 to 10.1 cents per pound.

[4]Estimated.

[5]Parity formula dropped from the loan calculation and no purchase program.

[6]Loan rate was reduced from 63 to 61 cents per pound on December 23, 1987, as a result of the Omnibus Budget Reconciliation Act of 1987.

[7]National Agricultural Statistics Service estimate.

## Beekeeper Demographics

### *Headquarters*

The largest number of beekeepers (207) were headquartered in the Midwest (table 4). Nearly a fifth reported headquarters in the Northwest (118) and the Southeast (113), while a tenth (52) reported headquarters in the Northeast.

### *Firm Size*

All three types of beekeeper firms reported increasing the number of colonies they maintained between 1985 and 1988 (fig. 4). The average firm size rose from 1,575 to 1,690 colonies for full-time beekeepers, from 117 to 140 for part-time, and from 11 to 15 for hobbyists.

Beekeepers in the Northwest reported the largest average number of colonies (1,625), while those in the Northeast reported the smallest number (291). Operations of full-time beekeepers in the Northwest averaged 2,588 colonies.

### *Honey Yields and Production*

Reporting beekeepers had average honey yields during 1985-88 of 85.4 pounds per colony. Yields were highest in the Midwest and Northwest, at around 97 pounds per colony, compared with only about 62 pounds per colony for other regions of the United States. Full-time beekeepers reported average yields of 87 pounds per colony, compared with 68 pounds for part-time beekeepers and 67 pounds for hobbyists.

The surveyed beekeepers produced nearly 20 percent of the Nation's honey output during 1985-88. Northwest producers accounted for about half of the honey production reported in the survey.

### *Age*

Ten percent of all beekeepers were younger than age 35, about one-fourth were in each of the age classes 35-44, 45-54, and 55-64, and 18 percent were 65 or older (fig. 5). As a group, hobby beekeepers were older, with 71 percent being age 45 or more, compared with around 60 percent of the full- and part-time beekeepers. Twenty-eight percent of the hobbyists were age 65 or older.

Beekeepers age 45-54 produced the most honey per beekeeper. Although only about 30 percent of the respondents were age 45-54, they accounted for nearly 15 million of the 36 million pounds of honey produced by respondents (table 5). The 45-54 age group had a slightly higher average honey yield, 88.2 pounds per colony, than the other age groups and more colonies per beekeeper (1,050).

### *Education*

The reporting beekeepers were well-educated, as 86 percent had at least a high school education (fig. 6).

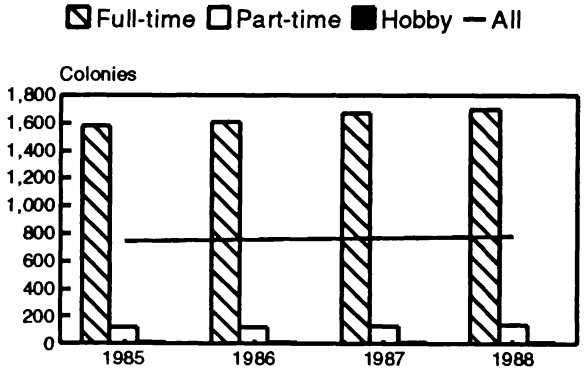
**Table 4—Beekeepers, colonies, and honey production, by firm type and region, 1985-88**

| Firm type | Unit | Region | | | | | Total |
|---|---|---|---|---|---|---|---|
| | | Northeast[1] | Southeast[2] | Midwest[3] | West[4] | Northwest[5] | |
| Full-time | | | | | | | |
| Beekeepers | Number | 11 | 38 | 78 | 51 | 72 | 250 |
| Colonies | Number | 10,691 | 62,970 | 85,891 | 61,089 | 186,389 | 407,030 |
| Production | Pounds | 711,997 | 3,940,912 | 8,634,681 | 3,802,451 | 18,247,508 | 35,337,549 |
| Yield/colony | Pounds | 66.6 | 62.6 | 100.5 | 62.2 | 97.9 | 86.8 |
| Part-time | | | | | | | |
| Beekeepers | Number | 34 | 47 | 100 | 26 | 39 | 246 |
| Colonies | Number | 4,382 | 5,209 | 12,614 | 3,993 | 5,243 | 31,441 |
| Production | Pounds | 235,713 | 296,218 | 916,245 | 252,144 | 440,023 | 2,140,343 |
| Yield/colony | Pounds | 53.8 | 56.9 | 72.6 | 63.1 | 83.9 | 68.1 |
| Hobby | | | | | | | |
| Beekeepers | Number | 7 | 28 | 29 | 7 | 7 | 78 |
| Colonies | Number | 79 | 421 | 363 | 44 | 101 | 1,008 |
| Production | Pounds | 5,279 | 25,419 | 27,036 | 3,022 | 7,022 | 67,778 |
| Yield/colony | Pounds | 66.8 | 60.4 | 74.5 | 68.7 | 69.5 | 67.2 |
| Total | | | | | | | |
| Beekeepers | Number | 52 | 113 | 207 | 84 | 118 | 574 |
| Colonies | Number | 15,152 | 68,600 | 98,868 | 65,126 | 191,733 | 439,479 |
| Production | Pounds | 952,989 | 4,262,549 | 9,577,962 | 4,057,617 | 18,694,553 | 37,545,670 |
| Yield/colony | Pounds | 62.9 | 62.1 | 96.9 | 62.3 | 97.5 | 85.4 |

Sample size = 574.
[1]CT,MA,MD,ME,NH,NJ,NY,PA,VT,DE,RI.
[2]AL,AR,GA,FL,LA,MO,MS,NC,SC,TN,VA,WV.
[3]IA,IL,IN,KS,KY,MI,MN,OH,WI,OK,TX.
[4]AZ,CO,CA,NM,NV,UT,WY,HI.
[5]AK,ID,MT,ND,NE,OR,SD,WA.

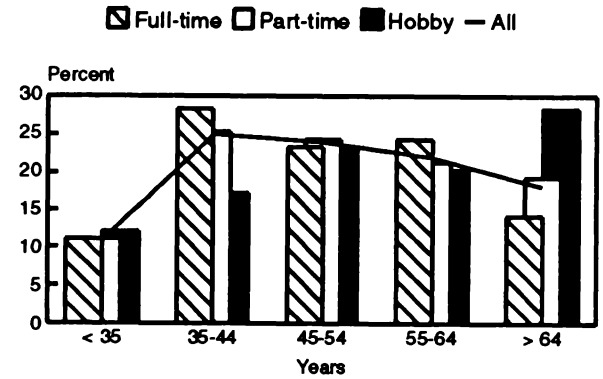
Source: 1988 Honey Industry Survey.

Figure 4
## Average number of colonies, by firm type, 1985-88




Sample size = 574
Source: 1988 Honey Industry Survey.

Figure 5
## Age distribution of beekeepers, by firm type, 1988




Sample size = 574
Source: 1988 Honey Industry Survey.

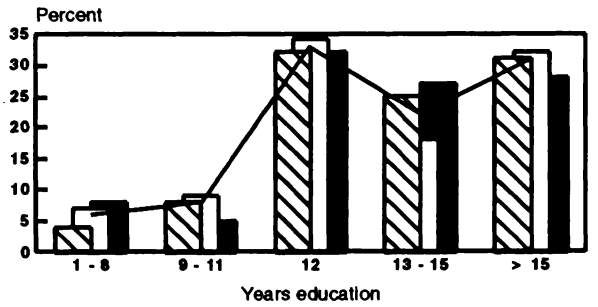
**Table 5—Beekeepers, colonies, and honey production, by firm type and age, 1985-88**

| Firm type | Unit | Age class | | | | | Total |
|---|---|---|---|---|---|---|---|
| | | Less than 35 | 35-44 | 45-54 | 55-64 | 65 or more | |
| | | | | *Years* | | | |
| Full-time | | | | | | | |
| Beekeepers | Number | 24 | 49 | 78 | 58 | 34 | 243 |
| Colonies | Number | 33,631 | 52,202 | 159,252 | 101,552 | 49,793 | 396,430 |
| Production | Pounds | 2,710,848 | 4,277,687 | 14,268,474 | 8,202,457 | 4,513,295 | 33,972,761 |
| Yield/colony | Pounds | 80.6 | 81.9 | 89.6 | 80.8 | 90.6 | 85.7 |
| Part-time | | | | | | | |
| Beekeepers | Number | 24 | 61 | 62 | 49 | 41 | 237 |
| Colonies | Number | 3,059 | 8,442 | 8,501 | 5,800 | 4,631 | 30,433 |
| Production | Pounds | 259,416 | 632,730 | 539,600 | 371,053 | 282,528 | 2,085,327 |
| Yield/colony | Pounds | 84.8 | 75.0 | 63.5 | 64.0 | 61.0 | 68.5 |
| Hobby | | | | | | | |
| Beekeepers | Number | 9 | 14 | 20 | 15 | 16 | 74 |
| Colonies | Number | 124 | 188 | 259 | 210 | 190 | 971 |
| Production | Pounds | 8,354 | 13,888 | 17,827 | 14,126 | 10,269 | 64,464 |
| Yield/colony | Pounds | 67.4 | 73.9 | 68.8 | 67.3 | 54.0 | 66.4 |
| Total | | | | | | | |
| Beekeepers | Number | 57 | 124 | 160 | 122 | 91 | 554 |
| Colonies | Number | 36,814 | 60,832 | 168,012 | 107,562 | 54,614 | 427,834 |
| Production | Pounds | 2,978,618 | 4,924,305 | 14,825,901 | 8,587,636 | 4,806,092 | 36,122,552 |
| Yield/colony | Pounds | 80.9 | 80.9 | 88.2 | 79.8 | 88.0 | 84.4 |
| Colonies/ beekeeper | Number | 646 | 491 | 1,050 | 882 | 600 | 772 |
| Production/ beekeeper | Pounds | 52,256 | 39,712 | 92,662 | 70,390 | 52,814 | 65,203 |

Sample size = 574.

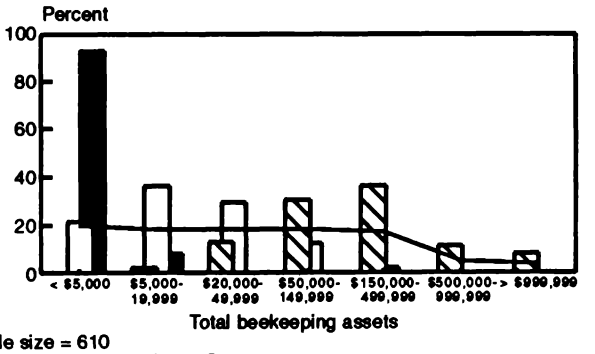
Source: 1988 Honey Industry Survey.

Figure 6
**Distribution of beekeepers, by firm type and years education, 1988**




Sample size = 654
Source: 1988 Honey Industry Survey.

Figure 7
**Distribution of beekeepers, by firm type and total assets, 1988**




Sample size = 610
Source: 1988 Honey Industry Survey.

More than half the beekeepers surveyed had attended college, with one-third attending at least 4 years.

### *Sex*

Five percent of the beekeepers surveyed were female.

### *Residence*

Most beekeepers live in rural areas or small communities. Fifty-six percent of the beekeepers resided on a farm or in a rural area (table 6). Of those who lived in nonrural areas, the largest share were in communities of less than 25,000 population.

### *Family Size*

Household size was about the same for all firm types, averaging 3.0 family members for the full-time and hobby beekeepers and 3.1 for the part-timers (table 7). Some beekeepers may have had uncounted children who lived out of the household.

### *Occupation*

Thirty-seven percent of the beekeepers listed beekeeping as their major occupation, virtually all of which were full-time beekeepers (table 8). Thirteen percent were retired and 11 percent held professional positions.

## Beekeeper Financial Characteristics

### *Total Assets*

Due to the small number of colonies they maintained, 92 percent of the hobbyists had less than $5,000 of assets in their beekeeping operations in 1988 (fig. 7). For the full-time beekeepers, 85 percent reported beekeeping assets of $50,000 or more and 19 percent had assets of $500,000 or more. About two-thirds of the part-time beekeepers had assets valued between $5,000 and $49,000 in 1988.

### *Total Debts*

Most of the hobby beekeepers and about 75 percent of the part-timers had no debt on the assets being used in their beekeeping operations in 1988 (fig. 8). Full-time beekeepers reported the highest debt load, with 45 percent having debts of $20,000 or more on their beekeeping operations in 1988. About one-third of the full-time beekeepers reported having no debt. In comparison, financial analysis of data obtained from USDA's 1988 Farm Costs and Returns Survey and representing 1,764,000 farms showed that 47.9 percent of all U.S. farms reported no debt in 1988.

### *Family Annual Gross Income*

Full-time beekeepers had the highest levels of family gross income. Twenty-one percent of the full-time beekeepers reported incomes of $70,000 or more in 1988, compared with only 8 percent of the part-time and hobbyists (fig. 9). About 27 percent of all the beekeepers had family gross incomes of less than $20,000 in 1988, and one-third had family incomes from $20,000 to $39,999.

### *Gross Income*

Over 96 percent of the hobby beekeepers received less than $2,500 gross income from their bee-keeping operations in 1988 (fig. 10). About two-thirds of the full-time beekeepers received $40,000 or more, and

**Table 6—Beekeepers' location of primary residence, by firm type, 1988**

| Location | Firm type | | | Total |
|---|---|---|---|---|
| | Full-time | Part-time | Hobby | |
| | | *Percent* | | |
| Farm | 10 | 12 | 5 | 27 |
| Rural, but not farm | 13 | 12 | 4 | 29 |
| Community | | | | |
| Less than 2,500 | 8 | 8 | 1 | 17 |
| 2,500-24,999 | 6 | 6 | 2 | 14 |
| 25,000-49,999 | 1 | 2 | 1 | 4 |
| 50,000-99,999 | 2 | 1 | 0 | 3 |
| 100,000 or more | 2 | 3 | 1 | 6 |
| Total | 42 | 44 | 14 | 100 |

Sample size = 649.

Source: 1988 Honey Industry Survey.

**Table 7—Average size of beekeeper households, by firm type and age, 1988**

| Age of household members | Firm type | | | | | | Total | |
|---|---|---|---|---|---|---|---|---|
| | Full-time | | Part-time | | Hobby | | | |
| | Number reporting | Number reported | Number reporting | Number reported | Number reporting | Number reported | Number reporting | Number reported |
| Under 6 years | 47 | 69 | 43 | 65 | 14 | 24 | 104 | 158 |
| 6-12 years | 62 | 102 | 64 | 106 | 19 | 28 | 145 | 236 |
| 13-18 years | 54 | 83 | 60 | 88 | 19 | 25 | 133 | 196 |
| 19 or older[1] | 267 | 560 | 257 | 545 | 82 | 171 | 606 | 1,276 |
| Total | 267 | 814 | 257 | 804 | 82 | 248 | 606 | 1,866 |
| Average | NA | 3.0 | NA | 3.1 | NA | 3.0 | NA | 3.079 |

Sample size = 606.
[1]All household members, including respondent.

Source: 1988 Honey Industry Survey.

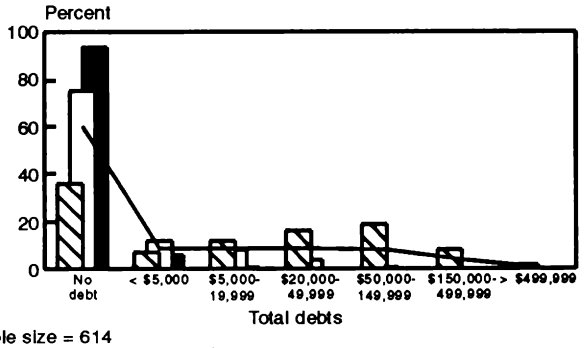
**Table 8—Major occupation of beekeepers, by firm type and sex, 1988**

| Occupation | Firm type | | | | | | Total | |
|---|---|---|---|---|---|---|---|---|
| | Full-time | | Part-time | | Hobby | | | |
| | Male | Female | Male | Female | Male | Female | Male | Female |
| | | | | *Percent* | | | | |
| Clerical | 0 | 0 | 1 | 0 | 0 | 0 | [1] | 0 |
| Professional | 5 | 0 | 15 | [1] | 17 | 1 | 11 | [1] |
| Managerial | 3 | 0 | 6 | 0 | 6 | 1 | 4 | [1] |
| Technician | 1 | 0 | 7 | [1] | 6 | 1 | 4 | [1] |
| Laborer | 4 | [1] | 11 | 0 | 16 | 0 | 9 | [1] |
| Own business | 1 | [1] | 7 | [1] | 1 | 1 | 4 | [1] |
| Sales | 4 | [1] | 5 | [1] | 2 | 0 | 4 | [1] |
| Beekeeping | 70 | 3 | 8 | 2 | 2 | 0 | 35 | 2 |
| Farmer | 2 | 0 | 7 | [1] | 8 | 0 | 5 | [1] |
| Retired | 3 | [1] | 18 | 1 | 27 | 0 | 13 | [1] |
| Other | 2 | 0 | 10 | 1 | 10 | 1 | 6 | [1] |
| Total | 95 | 5 | 95 | 5 | 95 | 5 | 95 | 5 |

Sample size = 649.
[1]Less than 1 percent.

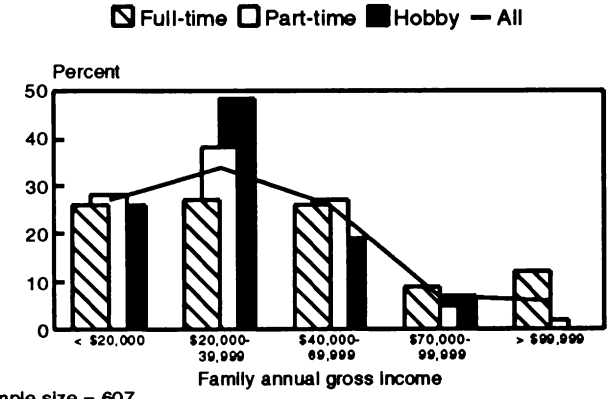
Source: 1988 Honey Industry Survey.

Figure 8
## Distribution of beekeepers, by firm type and total debts, 1988



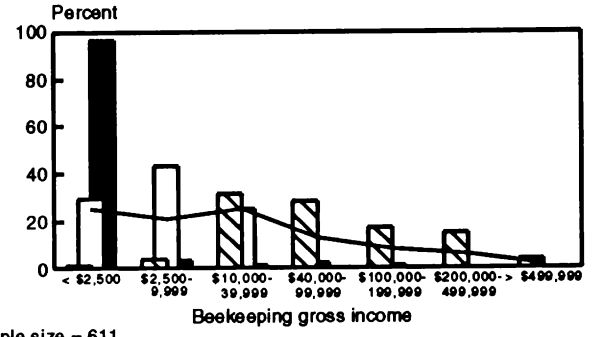

Sample size = 614
Source: 1988 Honey Industry Survey.

Figure 9
## Distribution of beekeepers, by firm type and family income, 1988




Sample size = 607
Source: 1988 Honey Industry Survey.

Figure 10
## Distribution of beekeepers, by firm type and gross income, 1988




Sample size = 611
Source: 1988 Honey Industry Survey

one-third received $100,000 or more gross income from beekeeping. Nearly 97 percent of the part-time beekeepers received less than $40,000 from beekeeping.

Honey sales and government payments from the honey price support program were the major sources of income for all classes of beekeeping operations during 1985-88 (fig. 11). Honey sales provided about half of total beekeeping income and honey program payments about one-fourth.

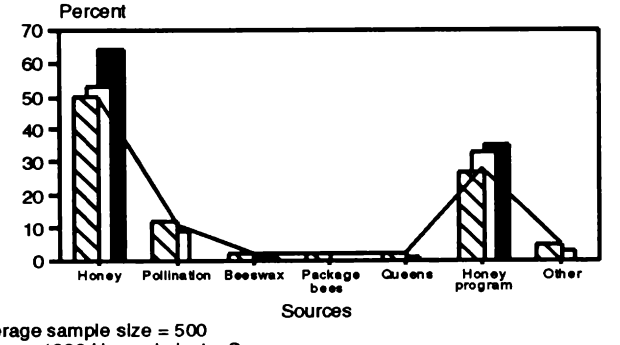
Government payments comprised slightly less of the income for full-time beekeepers (28 percent) than for the hobbyists (30 percent) and part-timers (33 percent). In actual dollars, however, the full-time beekeepers reported receiving government payments from the honey program averaging $30,500 per year for 1985 through 1988, compared with $2,575 for part-time beekeepers and $200 for hobbyists. Honey sales provided 64 percent of the hobby beekeepers' beekeeping income, compared with 53 percent for part-time beekeepers and 50 percent for full-time beekeepers.

Colony rentals for pollination was the third most important source of beekeeping income. However, colony rentals provided only 12 percent of the income for full-time beekeepers, 9 percent for part-time beekeepers, and less than 1 percent for hobbyists.

### *Gross Receipts*

Because of their higher yields, full-time beekeepers had the highest average gross receipts per colony, $64.31 in 1988, while hobbyists, with $37.89, had the

Figure 11
## Sources of beekeeping income, by firm type, 1985-88




Average sample size = 500
Source: 1988 Honey Industry Survey.

lowest (table 9). On a per-pound basis, the gross receipts per pound of honey produced averaged 77 to 78 cents a pound for the full- and part-time beekeepers and 50 cents for the hobby beekeepers. All three firm types averaged exactly 21 cents a pound from government honey price support payments in 1988. The hobby beekeepers did not report any receipts from pollination services, package bees, and queens and nucleus colonies.

The average gross receipts per colony and per pound of honey for the three firm types stratified by region are shown in tables 10-12. The average gross receipts of full-time beekeepers ranged from $80.79 per colony (78 cents per pound of honey) in the Midwest to $36.27 (53 cents per pound) in the Southeast in 1988 (table 10). For the part-time beekeepers, receipts per colony ranged from $69.35 in the West to $47.14 in the Northeast. Part-time beekeepers' receipts averaged 75 to 78 cents per pound in all regions, except in the West, where they averaged 91 cents per pound.

### *Gross Expenses*

The beekeepers were asked to estimate their gross expenditures in 1988 for labor, bees, supplies, equipment, buildings, overhead, marketing activities, and any other items. The total gross expenses reported by the 492 beekeepers responding averaged $52.41 per colony or 63 cents per pound of honey produced (table 13). Largely due to differences in hired labor costs, full-time beekeepers had the highest average total cost per colony and per pound of honey produced; hobbyists had the lowest cost.

Hired labor was the largest expense item for the full-time beekeepers, averaging $16.60 per colony. Hired labor averaged only $3.69 per colony for part-time beekeepers, and 57 cent for hobbyists. Supplies were the largest costs for the part-time and hobby beekeepers. Equipment and marketing costs were nearly the same for all three firm types.

Full-time beekeepers headquartered in the Midwest and Northwest had the highest average gross expenses per colony at about $62.00 (table 14). The lowest costs per colony were reported in the Southeast ($30.85) and in the West ($38.16). The lower expenses reported for labor, supplies, overhead, and marketing in the Southeast and West accounted for most of the difference. The yield per colony for full-time beekeepers was also the lowest in these regions, at 62 pounds (table 4). On a per-pound basis, average gross expenses were highest in the Northeast and Northwest at around 72 cents.

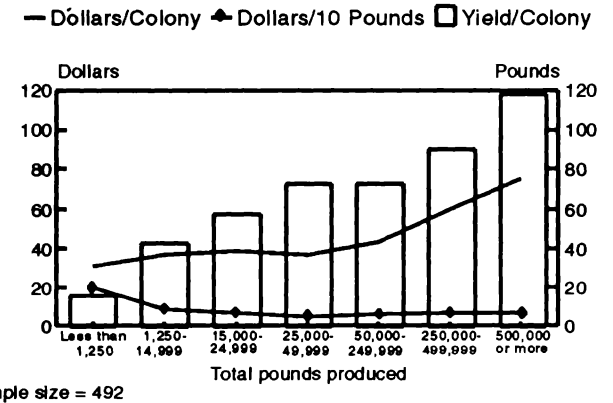
The average expenses of part-time beekeepers were similar across regions, ranging from $31.40 to $48.35 per colony or 50-64 cents a pound (table 15). However, average operating expenses varied considerably across regions for hobby beekeepers, ranging from $5.94 per colony in the Northeast to $68.29 in the West (table 16). This wide range of expenses was likely due to the small sample size for the two regions.

Gross expenses per colony were highest for those beekeepers having the higher levels of total honey production (table 17). However, because of higher yields per colony, the larger honey producers also had lower costs per pound of honey produced. Yield per colony in 1988 ranged from 15.6 pounds for beekeepers with less than 1,250 pounds of honey production to 117.8 pounds for those producing 500,000 or more pounds. The additional management associated with the more productive colonies and the added labor and overhead expenses for handling the higher volume of honey likely contributed to the higher cost per colony for the larger honey producers.

The largest cost efficiencies were achieved once firm size reached about 50,000 pounds of honey production (fig. 12). Costs per pound of honey actually rose slightly for the firm size classes with production above 50,000 pounds. Firms producing 25,000-49,999 pounds of honey had average costs of 50 cents a pound, while firm-size classes larger than 50,000 pounds had average costs ranging from 60 to 66 cents a pound.

The cost efficiencies associated with the amount of honey produced did not show up when firms were ranked according to number of hives. Cost per colony and per pound of honey did not decline when the number of hives per firm increased (table 18). Firms

Figure 12
**Average gross expenses, by honey production, 1988**




Sample size = 492
Source: 1988 Honey Industry Study.

**Table 9—Average gross receipts per colony and per pound of honey from beekeeping products, services, and programs of beekeeping operations, 1988**

| Firm type and unit | Products, services, and programs | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|
| | Honey | Pollination services | Beeswax | Package bees | Queens and nucleus colonies | Government payments | Other | |
| | | | | *Dollars* | | | | |
| Full-time | | | | | | | | |
| Per colony | 33.49 | 7.20 | 1.20 | 0.95 | 1.40 | 17.82 | 2.25 | 64.31 |
| Per pound | 0.40 | 0.09 | 0.01 | 0.01 | 0.02 | 0.21 | 0.03 | 0.77 |
| Part-time | | | | | | | | |
| Per colony | 36.58 | 3.57 | 0.64 | 0.06 | 0.43 | 15.96 | 1.47 | 58.71 |
| Per pound | 0.48 | 0.05 | 0.01 | 0.00 | 0.01 | 0.21 | 0.02 | 0.78 |
| Hobby | | | | | | | | |
| Per colony | 21.34 | 0.00 | 0.53 | 0.00 | 0.00 | 15.91 | 0.11 | 37.89 |
| Per pound | 0.28 | 0.00 | 0.01 | 0.00 | 0.00 | 0.21 | 0.00 | 0.50 |
| Total | | | | | | | | |
| Per colony | 33.68 | 6.93 | 1.16 | 0.88 | 1.33 | 17.68 | 2.19 | 63.85 |
| Per pound | 0.41 | 0.08 | 0.01 | 0.01 | 0.02 | 0.21 | 0.03 | 0.77 |

Sample size = 492 (Full-time = 224, Part-time = 210, Hobby = 58).

Source: 1988 Honey Industry Survey.

**Table 10—Average gross receipts per colony and per pound of honey from beekeeping products, services, and programs of full-time beekeeping operations, by region, 1988**

| Region and unit | Products, services, and programs | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|
| | Honey | Pollination services | Beeswax | Package bees | Queens and nucleus colonies | Government payments | Other | |
| | | | | *Dollars* | | | | |
| Northeast | | | | | | | | |
| Per colony | 31.84 | 2.38 | 1.19 | 0.00 | 0.60 | 13.12 | 0.00 | 49.13 |
| Per pound | 0.42 | 0.03 | 0.02 | 0.00 | 0.01 | 0.17 | 0.00 | 0.65 |
| Southeast | | | | | | | | |
| Per colony | 21.63 | 1.29 | 0.66 | 3.33 | 0.50 | 8.84 | 0.02 | 36.27 |
| Per pound | 0.31 | 0.02 | 0.01 | 0.05 | 0.01 | 0.13 | 0.00 | 0.53 |
| Midwest | | | | | | | | |
| Per colony | 47.56 | 1.48 | 1.24 | 0.86 | 3.99 | 25.19 | 0.47 | 80.79 |
| Per pound | 0.46 | 0.01 | 0.01 | 0.01 | 0.04 | 0.24 | 0.01 | 0.78 |
| West | | | | | | | | |
| Per colony | 40.02 | 11.57 | 1.22 | 1.37 | 0.82 | 7.32 | 0.91 | 63.23 |
| Per pound | 0.57 | 0.16 | 0.02 | 0.02 | 0.01 | 0.10 | 0.01 | 0.89 |
| Northwest | | | | | | | | |
| Per colony | 29.13 | 10.45 | 1.37 | 0.08 | 0.81 | 21.56 | 4.37 | 67.77 |
| Per pound | 0.34 | 0.12 | 0.02 | 0.00 | 0.01 | 0.25 | 0.05 | 0.79 |
| Total | | | | | | | | |
| Per colony | 33.48 | 7.19 | 1.21 | 0.97 | 1.40 | 17.80 | 3.45 | 65.50 |
| Per pound | 0.40 | 0.09 | 0.01 | 0.01 | 0.02 | 0.21 | 0.04 | 0.78 |

Sample size = 224.

Source: 1988 Honey Industry Survey.

**Table 11—Average gross receipts per colony and per pound of honey from beekeeping products, services, and programs of part-time beekeeping operations, by region, 1988**

| Region and unit | Products, services, and programs | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|
| | Honey | Pollination services | Beeswax | Package bees | Queens and nucleus colonies | Government payments | Other | |
| | *Dollars* | | | | | | | |
| Northeast | | | | | | | | |
| Per colony | 32.23 | 4.65 | 0.98 | 0.00 | 0.64 | 6.35 | 2.29 | 47.14 |
| Per pound | 0.52 | 0.07 | 0.02 | 0.00 | 0.01 | 0.10 | 0.04 | 0.76 |
| Southeast | | | | | | | | |
| Per colony | 35.19 | 1.61 | 0.77 | 0.00 | 0.00 | 9.99 | 0.81 | 48.37 |
| Per pound | 0.56 | 0.02 | 0.01 | 0.00 | 0.00 | 0.16 | 0.01 | 0.76 |
| Midwest | | | | | | | | |
| Per colony | 41.51 | 2.36 | 0.62 | 0.00 | 0.08 | 22.41 | 0.65 | 67.63 |
| Per pound | 0.47 | 0.03 | 0.01 | 0.00 | 0.00 | 0.25 | 0.01 | 0.77 |
| West | | | | | | | | |
| Per colony | 47.69 | 7.72 | 0.24 | 0.61 | 0.00 | 11.45 | 1.64 | 69.35 |
| Per pound | 0.63 | 0.10 | 0.00 | 0.01 | 0.00 | 0.15 | 0.02 | 0.91 |
| Northwest | | | | | | | | |
| Per colony | 24.61 | 5.32 | 0.50 | 0.00 | 1.72 | 17.89 | 3.33 | 53.37 |
| Per pound | 0.35 | 0.07 | 0.01 | 0.00 | 0.02 | 0.25 | 0.05 | 0.75 |
| Total | | | | | | | | |
| Per colony | 36.58 | 3.57 | 0.64 | 0.06 | 0.43 | 15.96 | 1.47 | 58.71 |
| Per pound | 0.48 | 0.05 | 0.01 | 0.00 | 0.01 | 0.21 | 0.02 | 0.78 |

Sample size = 210.

Source: 1988 Honey Industry Survey.

**Table 12—Average gross receipts per colony and per pound of honey from beekeeping products, services, and programs of hobby beekeeping operations, by region, 1988**

| Region and unit | Products, services, and programs | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|
| | Honey | Pollination services | Beeswax | Package bees | Queens and nucleus colonies | Government payments | Other | |
| | *Dollars* | | | | | | | |
| Northeast | | | | | | | | |
| Per colony | 26.57 | 0.00 | 1.88 | 0.00 | 0.00 | 1.47 | 0.00 | 29.92 |
| Per pound | 0.46 | 0.00 | 0.03 | 0.00 | 0.00 | 0.03 | 0.00 | 0.52 |
| Southeast | | | | | | | | |
| Per colony | 22.26 | 0.00 | 0.70 | 0.00 | 0.00 | 6.25 | 0.00 | 29.20 |
| Per pound | 0.37 | 0.00 | 0.01 | 0.00 | 0.00 | 0.10 | 0.00 | 0.48 |
| Midwest | | | | | | | | |
| Per colony | 18.55 | 0.00 | 0.34 | 0.00 | 0.00 | 35.96 | 0.33 | 55.18 |
| Per pound | 0.20 | 0.00 | 0.01 | 0.00 | 0.00 | 0.37 | 0.01 | 0.59 |
| West | | | | | | | | |
| Per colony | 18.37 | 0.00 | 0.70 | 0.00 | 0.00 | 3.49 | 0.00 | 22.56 |
| Per pound | 0.12 | 0.00 | 0.01 | 0.00 | 0.00 | 0.02 | 0.00 | 0.15 |
| Northwest | | | | | | | | |
| Per colony | 24.52 | 0.00 | 0.00 | 0.00 | 0.00 | 5.90 | 0.00 | 30.42 |
| Per pound | 0.43 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.00 | 0.53 |
| Total | | | | | | | | |
| Per colony | 21.34 | 0.00 | 0.53 | 0.00 | 0.00 | 15.91 | 0.11 | 37.89 |
| Per pound | 0.28 | 0.00 | 0.01 | 0.00 | 0.00 | 0.21 | 0.00 | 0.50 |

Sample size = 58.

Source: 1988 Honey Industry Survey.

**Table 13–Average gross expenses of beekeeping operations, by firm type, 1988**

| Cost item | Firm type | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Full-time | | Part-time | | Hobby | | Total | |
| | Per colony | Per pound | Per colony | Per pound | Per colony | Per pound | Per colony | Per pound |
| | *Dollars* | | | | | | | |
| Labor | 16.60 | 0.20 | 3.69 | 0.05 | 0.57 | 0.01 | 15.63 | 0.18 |
| Hired labor | 11.74 | 0.14 | 2.69 | 0.04 | 0.40 | 0.01 | 11.06 | 0.13 |
| Benefits | 1.01 | 0.01 | 0.17 | 0.00 | 0.00 | 0.00 | 0.95 | 0.01 |
| Other | 3.85 | 0.05 | 0.83 | 0.01 | 0.17 | 0.00 | 3.62 | 0.04 |
| Bees | 6.11 | 0.08 | 4.86 | 0.06 | 5.39 | 0.07 | 6.02 | 0.08 |
| Bee food | 4.23 | 0.05 | 2.15 | 0.03 | 1.21 | 0.02 | 4.07 | 0.05 |
| Queens and nucleus colonies | 1.29 | 0.02 | 1.64 | 0.02 | 3.01 | 0.04 | 1.32 | 0.02 |
| Package bees | 0.59 | 0.01 | 1.07 | 0.01 | 1.17 | 0.01 | 0.63 | 0.01 |
| Supplies | 7.45 | 0.09 | 10.16 | 0.14 | 13.39 | 0.18 | 7.66 | 0.09 |
| Equipment | 7.43 | 0.08 | 7.40 | 0.10 | 7.75 | 0.11 | 7.43 | 0.09 |
| Repairs/maint. | 3.71 | 0.04 | 3.48 | 0.05 | 2.71 | 0.04 | 3.69 | 0.04 |
| Gas and oil | 3.72 | 0.04 | 3.92 | 0.05 | 5.04 | 0.07 | 3.74 | 0.05 |
| Buildings | 3.59 | 0.04 | 7.49 | 0.10 | 1.73 | 0.02 | 3.88 | 0.05 |
| Repairs/maint. | 1.20 | 0.01 | 2.36 | 0.03 | 0.86 | 0.01 | 1.29 | 0.02 |
| Mortgage | 2.39 | 0.03 | 5.13 | 0.07 | 0.87 | 0.01 | 2.59 | 0.03 |
| Overhead | 8.90 | 0.12 | 7.03 | 0.11 | 2.66 | 0.03 | 8.75 | 0.11 |
| Utilities | 1.37 | 0.02 | 1.91 | 0.03 | 1.12 | 0.01 | 1.41 | 0.02 |
| Insurance | 2.15 | 0.03 | 1.29 | 0.02 | 0.05 | 0.00 | 2.09 | 0.02 |
| Taxes | 1.75 | 0.02 | 1.57 | 0.02 | 0.72 | 0.01 | 1.73 | 0.02 |
| Rent | 1.47 | 0.02 | 1.31 | 0.02 | 0.75 | 0.01 | 1.45 | 0.02 |
| Interest | 1.70 | 0.02 | 0.60 | 0.01 | 0.00 | 0.00 | 1.62 | 0.02 |
| Other | 0.46 | 0.01 | 0.35 | 0.01 | 0.02 | 0.00 | 0.45 | 0.01 |
| Marketing | 0.55 | 0.00 | 0.53 | 0.00 | 0.49 | 0.00 | 0.54 | 0.00 |
| Advertising | 0.30 | 0.00 | 0.17 | 0.00 | 0.06 | 0.00 | 0.29 | 0.00 |
| Subscriptions | 0.06 | 0.00 | 0.16 | 0.00 | 0.42 | 0.00 | 0.06 | 0.00 |
| Promotion | 0.13 | 0.00 | 0.10 | 0.00 | 0.00 | 0.00 | 0.13 | 0.00 |
| Fees | 0.06 | 0.00 | 0.10 | 0.00 | 0.01 | 0.00 | 0.06 | 0.00 |
| Other | 2.57 | 0.03 | 1.60 | 0.02 | 1.42 | 0.02 | 2.50 | 0.03 |
| Total | 53.20 | 0.64 | 42.76 | 0.58 | 33.40 | 0.44 | 52.41 | 0.63 |

Sample size = 492 (Full-time, 224; part-time, 210; hobby, 58).

Source: 1988 Honey Industry Survey.

**Table 14--Average gross expenses of full-time beekeeping operations, by region, 1988**

| Cost item | Region | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Northeast[1] | | Southeast[2] | | Midwest[3] | | West[4] | | Northwest[5] | |
| | Per colony | Per pound | Per colony | Per pound | Per colony | Per pound | Per colony | Per pound | Per colony | Per pound |
| | *Dollars* | | | | | | | | | |
| Labor | 24.38 | 0.32 | 9.11 | 0.14 | 14.94 | 0.14 | 11.86 | 0.17 | 21.17 | 0.25 |
| Hired labor | 17.49 | 0.23 | 7.27 | 0.11 | 10.47 | 0.10 | 8.07 | 0.11 | 14.83 | 0.17 |
| Benefits | 3.75 | 0.05 | 0.11 | 0.00 | 0.95 | 0.01 | 0.35 | 0.01 | 1.44 | 0.02 |
| Other | 3.14 | 0.04 | 1.73 | 0.03 | 3.52 | 0.03 | 3.44 | 0.05 | 4.90 | 0.06 |
| Bees | 4.17 | 0.05 | 3.25 | 0.05 | 6.40 | 0.07 | 3.67 | 0.06 | 7.90 | 0.09 |
| Bee food | 2.60 | 0.03 | 2.25 | 0.03 | 3.96 | 0.04 | 2.27 | 0.03 | 5.78 | 0.07 |
| Queens and nucleus colonies | 0.88 | 0.01 | 0.76 | 0.01 | 1.96 | 0.02 | 1.03 | 0.02 | 1.28 | 0.01 |
| Package bees | 0.69 | 0.01 | 0.24 | 0.01 | 0.48 | 0.01 | 0.37 | 0.01 | 0.84 | 0.01 |
| Supplies | 6.53 | 0.09 | 5.58 | 0.08 | 14.25 | 0.14 | 3.04 | 0.04 | 6.70 | 0.08 |
| Equipment | 6.09 | 0.08 | 4.76 | 0.07 | 7.93 | 0.07 | 6.06 | 0.09 | 8.66 | 0.10 |
| Repairs/maint. | 2.94 | 0.04 | 2.60 | 0.04 | 4.61 | 0.04 | 2.81 | 0.04 | 4.04 | 0.05 |
| Gas and oil | 3.15 | 0.04 | 2.16 | 0.03 | 3.32 | 0.03 | 3.25 | 0.05 | 4.62 | 0.05 |
| Buildings | 2.84 | 0.03 | 1.70 | 0.02 | 4.22 | 0.04 | 4.82 | 0.06 | 3.58 | 0.05 |
| Repairs/maint. | 1.04 | 0.01 | 0.98 | 0.01 | 1.45 | 0.01 | 0.92 | 0.01 | 1.28 | 0.02 |
| Mortgage | 1.80 | 0.02 | 0.72 | 0.01 | 2.77 | 0.03 | 3.90 | 0.05 | 2.30 | 0.03 |
| Overhead | 7.94 | 0.11 | 5.87 | 0.08 | 9.19 | 0.09 | 7.03 | 0.10 | 10.50 | 0.12 |
| Utilities | 1.20 | 0.02 | 0.94 | 0.01 | 1.66 | 0.01 | 1.05 | 0.01 | 1.51 | 0.02 |
| Insurance | 2.09 | 0.03 | 1.38 | 0.02 | 1.92 | 0.02 | 2.08 | 0.03 | 2.55 | 0.03 |
| Taxes | 1.56 | 0.02 | 1.34 | 0.02 | 2.08 | 0.02 | 1.38 | 0.02 | 1.88 | 0.02 |
| Rent | 0.75 | 0.01 | 0.95 | 0.01 | 0.90 | 0.01 | 1.11 | 0.02 | 2.05 | 0.02 |
| Interest | 1.74 | 0.02 | 1.16 | 0.02 | 2.11 | 0.02 | 1.03 | 0.01 | 1.94 | 0.02 |
| Other | 0.60 | 0.01 | 0.10 | 0.00 | 0.52 | 0.01 | 0.38 | 0.01 | 0.57 | 0.01 |
| Marketing | 0.71 | 0.01 | 0.18 | 0.00 | 1.49 | 0.01 | 0.19 | 0.00 | 0.38 | 0.00 |
| Advertising | 0.33 | 0.01 | 0.11 | 0.00 | 0.80 | 0.01 | 0.06 | 0.00 | 0.23 | 0.00 |
| Subscriptions | 0.05 | 0.00 | 0.02 | 0.00 | 0.14 | 0.00 | 0.05 | 0.00 | 0.04 | 0.00 |
| Promotion | 0.00 | 0.00 | 0.04 | 0.00 | 0.36 | 0.00 | 0.07 | 0.00 | 0.09 | 0.00 |
| Fees | 0.33 | 0.00 | 0.01 | 0.00 | 0.19 | 0.00 | 0.01 | 0.00 | 0.02 | 0.00 |
| Other | 2.02 | 0.03 | 0.40 | 0.01 | 3.93 | 0.04 | 1.49 | 0.02 | 3.12 | 0.04 |
| Total | 54.68 | 0.72 | 30.85 | 0.45 | 62.35 | 0.60 | 38.16 | 0.54 | 62.01 | 0.73 |

Sample size = 224 (Northeast, 9.; Southeast, 33; Midwest, 69; West, 47; Northwest, 66).
[1]CT, MA, MD, ME, NH, NJ, NY, PA, VT, DE, RI.
[2]AL, AR, GA, FL, LA, MO, MS, NC, SC, TN, VA, WV.
[3]IA, IL, IN, KS, KY, MI, MN, OH, WI, OK, TX.
[4]AZ, CO, CA, NM, NV, UT, WY, HI.
[5]AK, ID, MT, ND, NE, OR, SD, WA.

Source: 1988 Honey Industry Survey.

**Table 15--Average gross expenses of part-time beekeeping operations, by region, 1988**

| Cost item | Region | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Northeast[1] | | Southeast[2] | | Midwest[3] | | West[4] | | Northwest[5] | |
| | Per colony | Per pound | Per colony | Per pound | Per colony | Per pound | Per colony | Per pound | Per colony | Per pound |
| | *Dollars* | | | | | | | | | |
| Labor | 2.54 | 0.04 | 3.42 | 0.05 | 4.99 | 0.05 | 1.20 | 0.02 | 3.31 | 0.05 |
| Hired labor | 1.78 | 0.03 | 3.34 | 0.05 | 2.96 | 0.03 | 1.20 | 0.02 | 2.88 | 0.04 |
| Benefits | 0.14 | 0.00 | 0.08 | 0.00 | 0.18 | 0.00 | 0.00 | 0.00 | 0.36 | 0.01 |
| Other | 0.62 | 0.01 | 0.00 | 0.00 | 1.85 | 0.02 | 0.00 | 0.00 | 0.07 | 0.00 |
| Bees | 2.99 | 0.05 | 3.42 | 0.06 | 6.07 | 0.07 | 2.05 | 0.03 | 6.67 | 0.09 |
| Bee food | 1.79 | 0.03 | 2.17 | 0.03 | 2.35 | 0.03 | 0.81 | 0.01 | 2.66 | 0.04 |
| Queens and nucleus colonies | 0.79 | 0.01 | 1.25 | 0.02 | 1.65 | 0.02 | 1.16 | 0.02 | 2.98 | 0.04 |
| Package bees | 0.41 | 0.01 | 0.00 | 0.00 | 2.07 | 0.02 | 0.08 | 0.00 | 1.03 | 0.01 |
| Supplies | 10.57 | 0.17 | 7.52 | 0.12 | 11.19 | 0.12 | 9.24 | 0.12 | 10.95 | 0.15 |
| Equipment | 6.89 | 0.11 | 4.50 | 0.07 | 8.38 | 0.10 | 10.45 | 0.14 | 7.16 | 0.10 |
| Repairs/maint. | 4.49 | 0.07 | 2.14 | 0.03 | 4.24 | 0.05 | 2.38 | 0.03 | 3.08 | 0.04 |
| Gas and oil | 2.40 | 0.04 | 2.36 | 0.04 | 4.14 | 0.05 | 8.07 | 0.11 | 4.08 | 0.06 |
| Buildings | 6.89 | 0.11 | 3.52 | 0.06 | 9.38 | 0.10 | 10.16 | 0.13 | 6.65 | 0.09 |
| Repairs/maint. | 2.88 | 0.05 | 1.94 | 0.03 | 1.92 | 0.02 | 1.09 | 0.01 | 4.06 | 0.05 |
| Mortgage | 4.01 | 0.06 | 1.58 | 0.03 | 7.46 | 0.08 | 9.07 | 0.12 | 2.59 | 0.04 |
| Overhead | 8.51 | 0.14 | 5.87 | 0.09 | 7.06 | 0.09 | 6.90 | 0.09 | 7.16 | 0.11 |
| Utilities | 2.28 | 0.04 | 1.12 | 0.02 | 2.26 | 0.03 | 1.92 | 0.03 | 1.72 | 0.02 |
| Insurance | 1.26 | 0.02 | 0.85 | 0.01 | 1.45 | 0.02 | 1.55 | 0.02 | 1.28 | 0.02 |
| Taxes | 2.99 | 0.04 | 0.76 | 0.01 | 1.80 | 0.02 | 0.82 | 0.01 | 1.29 | 0.02 |
| Rent | 1.36 | 0.02 | 2.10 | 0.03 | 0.69 | 0.01 | 1.46 | 0.02 | 1.70 | 0.02 |
| Interest | 0.31 | 0.01 | 0.75 | 0.01 | 0.43 | 0.01 | 1.03 | 0.01 | 0.79 | 0.01 |
| Other | 0.31 | 0.01 | 0.29 | 0.01 | 0.43 | 0.01 | 0.12 | 0.00 | 0.38 | 0.01 |
| Marketing | 0.66 | 0.01 | 0.69 | 0.01 | 0.48 | 0.01 | 0.45 | 0.00 | 0.39 | 0.00 |
| Advertising | 0.18 | 0.00 | 0.22 | 0.00 | 0.16 | 0.00 | 0.15 | 0.00 | 0.11 | 0.00 |
| Subscriptions | 0.21 | 0.00 | 0.14 | 0.00 | 0.15 | 0.00 | 0.16 | 0.00 | 0.18 | 0.00 |
| Promotion | 0.27 | 0.00 | 0.00 | 0.00 | 0.14 | 0.00 | 0.00 | 0.00 | 0.04 | 0.00 |
| Fees | 0.00 | 0.00 | 0.33 | 0.01 | 0.03 | 0.00 | 0.14 | 0.00 | 0.06 | 0.00 |
| Other | 0.57 | 0.01 | 2.46 | 0.04 | 0.80 | 0.01 | 5.29 | 0.07 | 1.26 | 0.02 |
| Total | 39.62 | 0.64 | 31.40 | 0.50 | 48.35 | 0.55 | 45.74 | 0.60 | 43.55 | 0.61 |

Sample size = 210 (Northeast, 32; Southeast, 41; Midwest, 86; West, 17; Northwest, 34).
[1]CT,MA,MD,ME,NH,NJ,NY,PA,VT,DE,RI.
[2]AL,AR,GA,FL,LA,MO,MS,NC,SC,TN,VA,WV.
[3]IA,IL,IN,KS,KY,MI,MN,OH,WI,OK,TX.
[4]AZ,CO,CA,NM,NV,UT,WY,HI.
[5]AK,ID,MT,ND,NE,OR,SD,WA.

Source: 1988 Honey Industry Survey.

**Table 16--Average gross expenses of hobby beekeeping operations, by region, 1988**

| Cost item | Region | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Northeast[1] | | Southeast[2] | | Midwest[3] | | West[4] | | Northwest[5] | |
| | Per colony | Per pound | Per colony | Per pound | Per colony | Per pound | Per colony | Per pound | Per colony | Per pound |
| | *Dollars* | | | | | | | | | |
| Labor | 0.00 | 0.00 | 0.66 | 0.02 | 0.33 | 0.000 | 0.00 | 0.00 | 1.16 | 0.02 |
| Hired labor | 0.00 | 0.00 | 0.27 | 0.01 | 0.33 | 0.000 | 0.00 | 0.00 | 1.16 | 0.02 |
| Benefits | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.00 |
| Other | 0.00 | 0.00 | 0.39 | 0.01 | 0.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.00 |
| Bees | 0.70 | 0.01 | 2.66 | 0.05 | 8.79 | 0.090 | 17.44 | 0.11 | 2.88 | 0.05 |
| Bee food | 0.00 | 0.00 | 0.94 | 0.02 | 1.90 | 0.020 | 0.00 | 0.00 | 1.15 | 0.02 |
| Queens and nucleus colonies | 0.70 | 0.01 | 1.23 | 0.02 | 4.64 | 0.050 | 17.44 | 0.11 | 0.38 | 0.01 |
| Package bees | 0.00 | 0.00 | 0.49 | 0.01 | 2.25 | 0.020 | 0.00 | 0.00 | 1.35 | 0.02 |
| Supplies | 2.93 | 0.05 | 14.07 | 0.23 | 12.26 | 0.13 | 26.16 | 0.16 | 13.09 | 0.23 |
| Equipment | 1.38 | 0.03 | 8.08 | 0.13 | 7.18 | 0.08 | 8.87 | 0.06 | 9.61 | 0.16 |
| Repairs/maint. | 1.00 | 0.02 | 2.42 | 0.04 | 4.53 | 0.05 | 1.43 | 0.01 | 0.23 | 0.00 |
| Gas and oil | 0.38 | 0.01 | 5.66 | 0.09 | 2.65 | 0.03 | 7.44 | 0.05 | 9.38 | 0.16 |
| Buildings | 0.25 | 0.00 | 3.74 | 0.06 | 0.40 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| Repairs/maint. | 0.25 | 0.00 | 1.69 | 0.03 | 0.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Mortgage | 0.00 | 0.00 | 2.05 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Overhead | 0.38 | 0.01 | 2.31 | 0.04 | 2.11 | 0.03 | 14.54 | 0.10 | 1.77 | 0.04 |
| Utilities | 0.38 | 0.01 | 0.82 | 0.01 | 0.50 | 0.01 | 11.63 | 0.08 | 0.26 | 0.01 |
| Insurance | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Taxes | 0.00 | 0.00 | 0.92 | 0.02 | 0.65 | 0.01 | 1.51 | 0.01 | 0.28 | 0.01 |
| Rent | 0.00 | 0.00 | 0.57 | 0.01 | 0.81 | 0.01 | 1.40 | 0.01 | 1.12 | 0.02 |
| Interest | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Other | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.00 |
| Marketing | 0.30 | 0.01 | 0.43 | 0.01 | 0.56 | 0.01 | 1.28 | 0.01 | 0.30 | 0.01 |
| Advertising | 0.00 | 0.00 | 0.14 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Subscriptions | 0.30 | 0.01 | 0.26 | 0.01 | 0.56 | 0.01 | 1.28 | 0.01 | 0.30 | 0.01 |
| Promotion | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Fees | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Other | 0.00 | 0.00 | 3.32 | 0.05 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Total | 5.94 | 0.12 | 35.27 | 0.59 | 31.67 | 0.35 | 68.29 | 0.44 | 28.81 | 0.51 |

Sample size = 58 (Northeast, 4; Southeast, 21; Midwest, 22; West, 4; Northwest, 7).
[1]CT,MA,MD,ME,NH,NJ,NY,PA,VT,DE,RI.
[2]AL,AR,GA,FL,LA,MO,MS,NC,SC,TN,VA,WV.
[3]IA,IL,IN,KS,KY,MI,MN,OH,WI,OK,TX.
[4]AZ,CO,CA,NM,NV,UT,WY,HI.
[5]AK,ID,MT,ND,NE,OR,SD,WA.

Source: 1988 Honey Industry Survey.

**Table 17–Average gross expenses of beekeeping operations, by honey production, 1988**

| Cost item | Honey production (pounds) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Less than 1,250 | | 1,250-14,999 | | 15,000-24,999 | | 25,000-49,999 | | 50,000-249,999 | | 250,000-499,999 | | 500,000 or more | |
| | Per colony | Per pound | Per colony | Per pound | Per colony | Per pound | Per colony | Per pound | Per colony | Per pound | Per colony | Per pound | Per colony | Per pound |
| | *Dollars* | | | | | | | | | | | | | |
| Labor | 1.15 | 0.08 | 5.08 | 0.13 | 2.17 | 0.04 | 5.08 | 0.07 | 10.60 | 0.15 | 21.21 | 0.23 | 29.01 | 0.25 |
| Hired labor | 1.07 | 0.07 | 2.94 | 0.07 | 2.15 | 0.04 | 4.17 | 0.06 | 7.74 | 0.11 | 13.79 | 0.15 | 21.20 | 0.18 |
| Benefits | 0.00 | 0.00 | 0.22 | 0.01 | 0.02 | 0.00 | 0.29 | 0.00 | 0.63 | 0.01 | 1.10 | 0.01 | 2.03 | 0.02 |
| Other | 0.08 | 0.01 | 1.92 | 0.05 | 0.00 | 0.00 | 0.62 | 0.01 | 2.23 | 0.03 | 6.32 | 0.07 | 5.78 | 0.05 |
| Bees | 5.53 | 0.35 | 4.48 | 0.10 | 3.46 | 0.07 | 4.61 | 0.07 | 5.05 | 0.07 | 7.13 | 0.08 | 8.14 | 0.07 |
| Bee food | 2.38 | 0.15 | 1.98 | 0.05 | 1.41 | 0.03 | 2.68 | 0.04 | 2.92 | 0.04 | 4.83 | 0.05 | 7.09 | 0.06 |
| Queens and nucleus colonies | 2.77 | 0.18 | 1.46 | 0.03 | 0.98 | 0.02 | 1.44 | 0.02 | 1.40 | 0.02 | 1.55 | 0.02 | 0.89 | 0.01 |
| Package bees | 0.38 | 0.02 | 1.04 | 0.02 | 1.07 | 0.02 | 0.49 | 0.01 | 0.73 | 0.01 | 0.75 | 0.01 | 0.16 | 0.00 |
| Supplies | 8.19 | 0.52 | 8.28 | 0.19 | 8.70 | 0.15 | 6.48 | 0.09 | 8.33 | 0.12 | 4.65 | 0.05 | 9.55 | 0.09 |
| Equipment | 5.89 | 0.38 | 6.83 | 0.17 | 8.29 | 0.14 | 6.17 | 0.08 | 6.54 | 0.09 | 7.62 | 0.09 | 9.37 | 0.08 |
| Repairs/maint. | 2.79 | 0.18 | 3.64 | 0.09 | 3.06 | 0.05 | 2.52 | 0.03 | 3.26 | 0.05 | 4.11 | 0.05 | 4.63 | 0.04 |
| Gas and oil | 3.10 | 0.20 | 3.19 | 0.08 | 5.23 | 0.09 | 3.65 | 0.05 | 3.28 | 0.04 | 3.51 | 0.04 | 4.74 | 0.04 |
| Buildings | 2.39 | 0.15 | 3.33 | 0.08 | 4.73 | 0.08 | 6.27 | 0.08 | 3.40 | 0.05 | 5.63 | 0.06 | 2.20 | 0.02 |
| Repairs/maint. | 0.30 | 0.02 | 1.35 | 0.03 | 1.14 | 0.02 | 2.00 | 0.03 | 1.07 | 0.02 | 1.47 | 0.02 | 1.29 | 0.01 |
| Mortgage | 2.09 | 0.13 | 1.98 | 0.05 | 3.59 | 0.06 | 4.27 | 0.05 | 2.33 | 0.03 | 4.16 | 0.04 | 0.91 | 0.01 |
| Overhead | 6.27 | 0.41 | 6.50 | 0.15 | 7.70 | 0.14 | 6.77 | 0.10 | 7.16 | 0.09 | 9.55 | 0.11 | 12.51 | 0.10 |
| Utilities | 1.36 | 0.09 | 1.44 | 0.03 | 2.08 | 0.04 | 1.63 | 0.02 | 1.10 | 0.02 | 1.42 | 0.02 | 1.77 | 0.01 |
| Insurance | 1.02 | 0.07 | 1.32 | 0.03 | 1.37 | 0.02 | 1.24 | 0.02 | 1.62 | 0.02 | 2.62 | 0.03 | 3.09 | 0.03 |
| Taxes | 2.26 | 0.15 | 1.66 | 0.04 | 1.76 | 0.03 | 1.40 | 0.02 | 1.80 | 0.02 | 1.82 | 0.02 | 1.62 | 0.01 |
| Rent | 1.56 | 0.10 | 1.23 | 0.03 | 0.85 | 0.02 | 0.83 | 0.01 | 1.08 | 0.01 | 1.71 | 0.02 | 2.28 | 0.02 |
| Interest | 0.00 | 0.00 | 0.59 | 0.01 | 1.06 | 0.02 | 1.36 | 0.02 | 1.28 | 0.02 | 1.49 | 0.02 | 2.92 | 0.02 |
| Other | 0.07 | 0.00 | 0.26 | 0.01 | 0.58 | 0.01 | 0.31 | 0.01 | 0.28 | 0.00 | 0.49 | 0.00 | 0.83 | 0.01 |
| Marketing | 0.27 | 0.01 | 0.56 | 0.00 | 0.31 | 0.00 | 0.33 | 0.00 | 0.69 | 0.01 | 0.49 | 0.00 | 0.43 | 0.00 |
| Advertising | 0.03 | 0.00 | 0.19 | 0.00 | 0.09 | 0.00 | 0.11 | 0.00 | 0.37 | 0.01 | 0.23 | 0.00 | 0.32 | 0.00 |
| Subscriptions | 0.17 | 0.01 | 0.16 | 0.00 | 0.13 | 0.00 | 0.08 | 0.00 | 0.08 | 0.00 | 0.03 | 0.00 | 0.03 | 0.00 |
| Promotion | 0.00 | 0.00 | 0.07 | 0.00 | 0.04 | 0.00 | 0.11 | 0.00 | 0.17 | 0.00 | 0.17 | 0.00 | 0.06 | 0.00 |
| Fees | 0.07 | 0.00 | 0.14 | 0.00 | 0.05 | 0.00 | 0.03 | 0.00 | 0.07 | 0.00 | 0.06 | 0.00 | 0.02 | 0.00 |
| Other | 1.34 | 0.09 | 1.84 | 0.04 | 3.10 | 0.05 | 0.75 | 0.01 | 1.69 | 0.02 | 3.48 | 0.04 | 3.73 | 0.03 |
| Total | 31.03 | 1.99 | 36.90 | 0.86 | 38.46 | 0.67 | 36.46 | 0.50 | 43.46 | 0.60 | 59.76 | 0.66 | 74.94 | 0.64 |

Sample size = 492 (Less than 1,250 lbs., 51; 1,250-14,999 lbs., 183; 15,000-24,999 lbs., 49; 25,000-49,999 lbs., 64; 50,000-249,999 lbs., 106; 250,000-499,999 lbs., 26; 500,000 or more lbs., 13).

Average yield/colony = (Less than 1,250 lbs., 15.6; 1,250-14,999 lbs., 42.6; 15,000-24,999 lbs., 57.4; 25,000-49,999 lbs., 72.9; 50,000-249,999 lbs., 72.5; 250,000-499,999 lbs., 90.3; 500,000 or more lbs., 117.8).

Source: 1988 Honey Industry Survey.

**Table 18—Average gross expenses of beekeeping operations, by colony size, 1988**

| Cost item | Colony size | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fewer than 25 | | 25-299 | | 300-499 | | 500-999 | | 1,000-4,999 | | 5,000-9,999 | | 10,000 or more | |
| | Per colony | Per pound | Per colony | Per pound | Per colony | Per pound | Per colony | Per pound | Per colony | Per pound | Per colony | Per pound | Per colony | Per pound |
| | *Dollars* | | | | | | | | | | | | | |
| Labor | 0.52 | 0.00 | 5.20 | 0.07 | 2.80 | 0.04 | 11.08 | 0.14 | 15.32 | 0.17 | 27.40 | 0.40 | 17.40 | 0.27 |
| Hired labor | 0.30 | 0.00 | 2.95 | 0.04 | 2.76 | 0.04 | 7.29 | 0.09 | 10.87 | 0.12 | 17.10 | 0.25 | 15.22 | 0.24 |
| Benefits | 0.00 | 0.00 | 0.25 | 0.00 | 0.02 | 0.00 | 0.65 | 0.01 | 0.79 | 0.01 | 2.59 | 0.04 | 0.68 | 0.01 |
| Other | 0.22 | 0.00 | 2.00 | 0.03 | 0.02 | 0.00 | 3.14 | 0.04 | 3.66 | 0.04 | 7.71 | 0.11 | 1.50 | 0.02 |
| Bees | 6.75 | 0.09 | 5.31 | 0.08 | 3.36 | 0.05 | 5.02 | 0.07 | 6.28 | 0.06 | 8.96 | 0.13 | 3.78 | 0.06 |
| Bee food | 1.23 | 0.02 | 1.95 | 0.03 | 1.89 | 0.03 | 2.84 | 0.04 | 4.08 | 0.04 | 7.16 | 0.11 | 3.39 | 0.05 |
| Queens and nucleus colonies | 3.96 | 0.05 | 1.83 | 0.03 | 1.19 | 0.02 | 1.60 | 0.02 | 1.36 | 0.01 | 1.57 | 0.02 | 0.39 | 0.01 |
| Package bees | 1.56 | 0.02 | 1.53 | 0.02 | 0.28 | 0.00 | 0.58 | 0.01 | 0.84 | 0.01 | 0.23 | 0.00 | 0.00 | 0.00 |
| Supplies | 12.67 | 0.15 | 12.26 | 0.17 | 7.09 | 0.09 | 18.07 | 0.22 | 6.40 | 0.07 | 7.42 | 0.11 | 2.83 | 0.04 |
| Equipment | 7.37 | 0.09 | 8.10 | 0.11 | 5.60 | 0.07 | 7.87 | 0.10 | 7.78 | 0.08 | 7.93 | 0.11 | 5.54 | 0.08 |
| Repairs/maint. | 3.08 | 0.04 | 3.93 | 0.05 | 1.93 | 0.02 | 4.18 | 0.05 | 3.65 | 0.04 | 4.31 | 0.06 | 3.34 | 0.05 |
| Gas and oil | 4.29 | 0.05 | 4.17 | 0.06 | 3.67 | 0.05 | 3.69 | 0.05 | 4.13 | 0.04 | 3.62 | 0.05 | 2.20 | 0.03 |
| Buildings | 2.52 | 0.03 | 7.12 | 0.10 | 4.34 | 0.06 | 5.30 | 0.06 | 4.22 | 0.04 | 3.14 | 0.05 | 0.50 | 0.01 |
| Repairs/maint. | 1.37 | 0.02 | 1.94 | 0.03 | 1.43 | 0.02 | 2.73 | 0.03 | 1.15 | 0.01 | 1.22 | 0.02 | 0.40 | 0.01 |
| Mortgage | 1.15 | 0.01 | 5.18 | 0.07 | 2.91 | 0.04 | 2.57 | 0.03 | 3.07 | 0.03 | 1.92 | 0.03 | 0.10 | 0.00 |
| Overhead | 3.49 | 0.04 | 8.26 | 0.12 | 5.70 | 0.08 | 9.38 | 0.12 | 8.51 | 0.10 | 12.61 | 0.19 | 6.36 | 0.09 |
| Utilities | 1.52 | 0.02 | 2.02 | 0.03 | 1.62 | 0.02 | 1.58 | 0.02 | 1.43 | 0.02 | 1.25 | 0.02 | 0.99 | 0.01 |
| Insurance | 0.07 | 0.00 | 1.58 | 0.02 | 1.04 | 0.01 | 1.61 | 0.02 | 2.16 | 0.02 | 3.90 | 0.06 | 0.82 | 0.01 |
| Taxes | 0.94 | 0.01 | 2.05 | 0.03 | 1.25 | 0.02 | 2.58 | 0.03 | 1.70 | 0.02 | 2.41 | 0.04 | 0.47 | 0.01 |
| Rent | 0.96 | 0.01 | 1.40 | 0.02 | 1.12 | 0.02 | 1.31 | 0.02 | 1.29 | 0.01 | 2.78 | 0.03 | 0.90 | 0.01 |
| Interest | 0.00 | 0.00 | 0.78 | 0.01 | 0.45 | 0.01 | 2.00 | 0.03 | 1.50 | 0.02 | 1.95 | 0.03 | 2.30 | 0.04 |
| Other | 0.00 | 0.00 | 0.43 | 0.01 | 0.22 | 0.00 | 0.30 | 0.00 | 0.43 | 0.01 | 0.32 | 0.01 | 0.88 | 0.01 |
| Marketing | 0.64 | 0.01 | 0.62 | 0.00 | 0.33 | 0.00 | 1.89 | 0.01 | 0.40 | 0.00 | 0.33 | 0.00 | 0.35 | 0.01 |
| Advertising | 0.06 | 0.00 | 0.19 | 0.00 | 0.07 | 0.00 | 0.94 | 0.01 | 0.22 | 0.00 | 0.19 | 0.00 | 0.31 | 0.01 |
| Subscriptions | 0.54 | 0.01 | 0.17 | 0.00 | 0.11 | 0.00 | 0.25 | 0.00 | 0.03 | 0.00 | 0.05 | 0.00 | 0.00 | 0.00 |
| Promotion | 0.00 | 0.00 | 0.10 | 0.00 | 0.10 | 0.00 | 0.45 | 0.00 | 0.12 | 0.00 | 0.08 | 0.00 | 0.01 | 0.00 |
| Fees | 0.04 | 0.00 | 0.16 | 0.00 | 0.05 | 0.00 | 0.25 | 0.00 | 0.03 | 0.00 | 0.01 | 0.00 | 0.03 | 0.00 |
| Other | 2.11 | 0.02 | 1.59 | 0.02 | 1.68 | 0.02 | 1.98 | 0.02 | 2.92 | 0.03 | 3.42 | 0.05 | 0.95 | 0.02 |
| Total | 36.07 | 0.43 | 48.46 | 0.67 | 30.90 | 0.41 | 60.59 | 0.74 | 51.83 | 0.55 | 71.21 | 1.04 | 37.71 | 0.58 |

Sample size = 492 (Fewer than 25 colonies, 52; 25-299 colonies, 202; 300-499 colonies, 57; 500-999 colonies, 63; 1,000-4,999 colonies, 106; 5,000-9,999 colonies, 9; 10,000 or more colonies, 3).

Average yield/colony (Fewer than 25 colonies, 84.0; 25-299 colonies, 72.4; 300-499 colonies, 75.8; 500-999 colonies, 82.2; 1,000-4,999 colonies, 94.3; 5,000-9,999 colonies, 68.4; 10,000 or more colonies, 64.6).

Source: 1988 Honey Industry Survey.

with less than 25 colonies had an average cost of $36.07 per colony and 43 cents per pound of honey compared with $37.71 per colony and 58 cents per pound for firms with 10,000 or more colonies. Also, as noted in the footnotes to table 18, honey yield per colony was higher for beekeepers with less than 5,000 colonies in 1988.

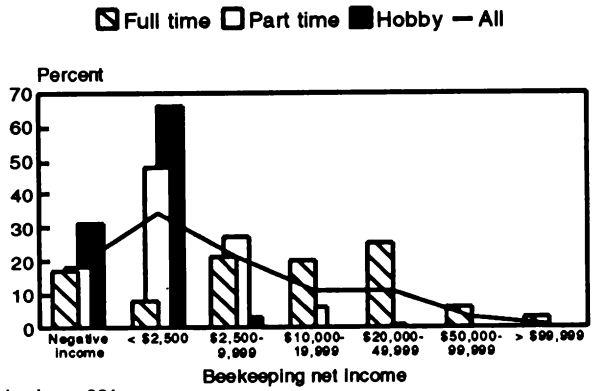
A possible explanation for the absence of cost efficiencies per colony is that the larger beekeepers were using their colonies for providing migratory pollination services and were shown to have lower annual honey yields.

### *Net Income*

Net income represents the return to the unpaid land, labor, capital, and management used in the beekeeping operation and was estimated as the gross income less gross expenses. Nineteen percent of the respondents had a negative net income in 1988 and one-third had a positive net income from beekeeping operations of less than $2,500 (fig. 13). Hobby beekeepers had the lowest net incomes in 1988, with 30 percent having a negative net income and another two-thirds with less than $2,500 net income. Full-time beekeepers had the highest net income, with one-third having net incomes of $20,000 or more and 54 percent with $10,000 or more. About 75 percent of the part-time beekeepers had a positive net income, but less than $10,000.

Net income for all beekeepers, which includes government payments, averaged $11.44 per colony and 14 cents per pound (table 19). Average net income per colony and per pound was highest for part-time beekeepers and lowest for hobbyists.

Figure 13
**Distribution of beekeepers, by firm type and net income, 1988**




Sample size = 601
Source: 1988 Honey Industry Survey.

Based on colony numbers, average net income per colony, at $19.64, was highest for beekeepers with 1,000-4,999 colonies and lowest for beekeepers with 5,000-9,999 colonies, at -$12.81 (table 20). Average net income ranged from 25 to -19 cents a pound.

Based on honey production, average net income per colony and per pound was negative for beekeepers with less than 15,000 pounds of production in 1988 (table 21). The highest net incomes were reported by beekeepers who produced 15,000-49,999 pounds of honey in 1988.

The net incomes of full-time beekeepers averaged highest in the West at 35 cents a pound (table 22). In contrast, full-time beekeepers in the Northwest and Southeast reported net incomes averaging 6 and 8 cents a pound. Nine full-time beekeepers in the Northeast had an average net income of -7 cents a pound.

The higher net income of the full-time beekeepers in the West was due to their lower operating expenses (table 14). High operating expenses caused the low net incomes in the Northwest, while low gross receipts caused the low incomes in the Southeast.

For part-time beekeepers, average net incomes per colony were highest in the West and Midwest and lowest in the Northeast and Northwest. For hobby beekeepers, negative net incomes were reported in the Southeast and West.

### Bee and Honey Losses

About half of the 688 beekeepers responding to the survey suffered a loss of production due to drought, diseases, mites, or other causes between 1985 and 1988 (table 23). The largest percentage of the beekeepers reported production losses in 1988 from drought. Only 5 percent of the beekeepers had losses from disease in 1988. The mite problem appears to be getting more severe, as the percentage of beekeepers incurring a loss of production from mites increased from 3 percent in 1985 to 15 percent in 1988. Also, the loss of honey production from drought affected progressively more beekeepers during 1985-88.

Other sources of bee and honey losses are pesticides and winter kill, which were reported by 241 beekeepers and 552 beekeepers in 1988, respectively (table 24). For the beekeepers with pesticide losses, 37 percent of their colonies were affected, with 30 percent of the affected colonies having 50 percent or more loss of honeybees. About 70 percent of the full-time and part-time beekeepers indicated that their bee losses occurred

## Table 19—Average net income of beekeeping operations, by firm type, 1988

| Item | Firm type | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Full-time | | Part-time | | Hobby | | Total | |
| | Per colony | Per pound | Per colony | Per pound | Per colony | Per pound | Per colony | Per pound |
| | *Dollars* | | | | | | | |
| Gross receipts | 64.31 | 0.77 | 58.71 | 0.78 | 37.89 | 0.50 | 63.85 | 0.77 |
| Gross expenses | 53.20 | 0.64 | 42.76 | 0.58 | 33.40 | 0.44 | 52.41 | 0.63 |
| Net income[1] | 11.11 | 0.13 | 15.95 | 0.20 | 4.49 | 0.06 | 11.44 | 0.14 |

Sample size = 492 (Full-time, 224; part-time, 210; hobby, 58).
[1]Return to unpaid land, labor, capital, and management.

Source: 1988 Honey Industry Survey.

## Table 20—Average net income of beekeeping operations, by colony numbers, 1988

| Unit | Colony numbers | | | | | | |
|---|---|---|---|---|---|---|---|
| | Fewer than 25 | 25-299 | 300-499 | 500-999 | 1,000-4,999 | 5,000-9,999 | 10,000 or more |
| | *Dollars* | | | | | | |
| Per colony | 14.64 | 10.62 | 18.86 | 2.76 | 19.64 | -12.81 | 10.15 |
| Per pound | 0.18 | 0.15 | 0.25 | 0.03 | 0.21 | -0.19 | 0.16 |

Sample size = 492 (Full-time, 224; part-time, 210; hobby, 58).

Source: 1988 Honey Industry Survey.

## Table 21—Average net income of beekeeping operations, by honey production, 1988

| Unit | Honey production (pounds) | | | | | | |
|---|---|---|---|---|---|---|---|
| | Less than 1,250 | 1,250-14,999 | 15,000-24,999 | 25,000-49,999 | 50,000-249,999 | 250,000-499,999 | 500,000 or more |
| | *Dollars* | | | | | | |
| Per colony | -9.20 | -1.96 | 18.32 | 18.69 | 12.54 | 16.28 | 4.83 |
| Per pound | -0.59 | -0.05 | 0.32 | 0.25 | 0.17 | 0.18 | 0.04 |

Sample size = 492 (Full-time, 224; part-time, 210; hobby, 58).

Source: 1988 Honey Industry Survey.

## Table 22—Average net income of beekeeping operations, by firm type and region, 1988

| Type firm and unit | Region | | | | |
|---|---|---|---|---|---|
| | Northeast[1] | Southeast[2] | Midwest[3] | West[4] | Northwest[5] |
| | *Dollars* | | | | |
| Full-time | | | | | |
| Per colony | -5.55 | 5.42 | 18.44 | 25.07 | 5.76 |
| Per pound | -0.07 | 0.08 | 0.18 | 0.35 | 0.06 |
| Part-time | | | | | |
| Per colony | 7.52 | 16.97 | 19.28 | 23.61 | 9.82 |
| Per pound | 0.12 | 0.26 | 0.22 | 0.31 | 0.14 |
| Hobby | | | | | |
| Per colony | 23.98 | -6.07 | 23.51 | -45.73 | 1.61 |
| Per pound | 0.40 | -0.11 | 0.24 | -0.29 | 0.02 |

Sample size = 492.
[1]CT,MA,MD,ME,NH,NJ,NY,PA,VT,DE,RI.
[2]AL,AR,GA,FL,LA,MO,MS,NC,SC,TN,VA,WV.
[3]IA,IL,IN,KS,KY,MI,MN,OH,WI,OK,TX.
[4]AZ,CO,CA,NM,NV,UT,WY,HI.
[5]AK,ID,MT,ND,NE,OR,SD,WA.

Source: 1988 Honey Industry Survey.

**Table 23--Beekeepers reporting production losses, by firm type, 1985-88**

| Reason for loss | Firm type | | | | | | | | | | | | Total | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Full-time | | | | Part-time | | | | Hobby | | | | | | | |
| | 1985 | 1986 | 1987 | 1988 | 1985 | 1986 | 1987 | 1988 | 1985 | 1986 | 1987 | 1988 | 1985 | 1986 | 1987 | 1988 |
| | *Percent* | | | | | | | | | | | | | | | |
| Drought | 29 | 25 | 28 | 46 | 13 | 17 | 26 | 36 | 7 | 9 | 14 | 29 | 19 | 19 | 25 | 39 |
| Disease | 2 | 2 | 3 | 3 | 4 | 5 | 7 | 7 | 4 | 2 | 4 | 3 | 3 | 3 | 5 | 5 |
| Mites | 5 | 5 | 9 | 22 | 2 | 3 | 5 | 11 | 1 | 1 | 2 | 5 | 3 | 4 | 6 | 15 |
| Other | 26 | 28 | 24 | 19 | 15 | 19 | 16 | 18 | 12 | 9 | 10 | 10 | 20 | 21 | 18 | 17 |
| Reported a loss | 51 | 49 | 47 | 61 | 29 | 36 | 42 | 53 | 21 | 2 | 6 | 42 | 37 | 37 | 44 | 52 |

Sample size = 688 (full-time, 290; part-time, 301; hobby, 97).

Source: 1988 Honey Industry Survey.

**Table 24--Beekeeper pesticide and winter losses, by firm type, 1988**

| Type of loss | Unit | Firm type | | | Total |
|---|---|---|---|---|---|
| | | Full-time | Part-time | Hobby | |
| Pesticides | | | | | |
| Beekeepers with losses | Number | 147 | 84 | 10 | 241 |
| Colonies affected | Percent | 39 | 31 | 50 | 37 |
| Colonies with 50 percent or more loss | Percent | 29 | 29 | 49 | 30 |
| Location of losses | | | | | |
| Colony | Percent | 6 | 15 | 45 | 10 |
| Field | Percent | 23 | 17 | 33 | 22 |
| Both | Percent | 71 | 68 | 22 | 68 |
| Reimbursement received for losses | | | | | |
| Yes | Percent | 1 | 4 | 0 | 2 |
| No | Percent | 99 | 96 | 100 | 98 |
| Winter kill | | | | | |
| Beekeepers with losses | Number | 255 | 247 | 50 | 552 |
| Colonies affected | Percent | 22 | 18 | 22 | 20 |
| Colonies with 50 percent or more loss | Percent | 38 | 32 | 32 | 35 |
| Method used to replace winter losses | | | | | |
| Purchase package bees | Percent | 22 | 19 | 30 | 21 |
| Division with purchased queen | Percent | 62 | 62 | 52 | 61 |
| Division with own raised queen | Percent | 57 | 50 | 38 | 52 |

Source: 1988 Honey Industry Survey.

both in the colony and in the field. However, 45 percent of the hobby beekeepers indicated specifically that their pesticide losses occurred in the colony.

This finding that hobby beekeepers incur less loss of bees in the field is probably related to the variations in floral sources used by the three types of beekeepers. Colonies operated by commercial beekeepers are more likely to be located near agricultural crops that receive frequent applications of pesticides and thus incur heavy losses in the field. Hobby beekeepers' colonies are more likely to be located in remote locations that contain garden crops, flowers, and weeds that receive much lower levels of pesticides. Thus, honeybees foraging in these areas are more likely to die in the colony than in the field.

Beekeepers experiencing winter kill reported that about 20 percent of their colonies were affected in 1988. Of the affected colonies, 35 percent incurred 50 percent or more loss of bees. About 60 percent of the beekeepers replaced their winter losses of bees by divisions with purchased queens and half used divisions with own-raised queens.

**Transportation**

Some beekeepers maintain their colonies in the same location each year. Others, called migratory beekeepers, move their colonies from one geographic area to another to increase honey production and/or pollinate selected crops. Production may be increased by moving the colonies to different nectar-secreting plants or to the same plants, but during different blooming periods.

Most migratory beekeepers move their colonies after nightfall when all the honeybees are in the hive. The entrances of the colonies can be open or closed during the move. The colonies are smoked, picked up by hand or hoist, and stacked on large flat-bed trucks. The colonies are then secured with rope and covered with a wet burlap tarpaulin or plastic screen. Few bees attempt to leave the hive while the truck is in motion, but may begin to leave if the truck stops during daylight hours. If possible, beekeepers carry enough fuel so they will not have to refuel enroute.

Some migratory beekeepers in States along the Canadian border move their colonies into California, the Carolinas, Georgia, Florida, or other States along the gulf coast. Others migrate in a more east-west direction, such as from Texas to Colorado, or from the Rocky Mountain States into California and Washington. The north-south migrations are primarily for colony buildup in the South and honey production in the North. East-west migrations are primarily between honey flows.

About 22 percent of the beekeepers surveyed indicated they transported honeybee colonies among States during 1985-88 (table 25). Over three-fourths of these beekeepers were full-time operators. The migratory beekeepers annually transported their honeybee colonies from 37,500 to 40,000 miles, or about 20 miles per colony. In contrast, the nonmigratory beekeepers annually transported their colonies 5,300 to 6,200 miles, or about 11 miles per colony. The part-time beekeepers, due to their smaller number of colonies, tended to move their colonies slightly farther per colony than the full-time beekeepers.

There were no significant differences between full-time and part-time beekeepers regarding the purposes of transporting bee colonies to other States (table 26). Nearly half the migratory beekeepers reported that the main purpose was to winter their colonies. Around 40 percent indicated they moved their colonies to provide paid pollination services, and one-third indicated they moved to seek floral sources.

**Beekeeper Labor Hiring Practices**

***Labor Use***

The amount of labor used in beekeeping operations varied significantly among firm types, geographic regions, seasons, production levels, and income. Full-time beekeepers used 144.4 hours of labor per week in their operations compared with only 26.7 hours per week for part-time beekeepers and 9.1 hours for hobbyists (table 27). Full-time beekeepers in the Northwest and Midwest reported the most labor hours, averaging around 170 hours per week compared with 90 hours in the West. The highest levels of labor use for all beekeepers occurred during April-September. About 45 percent of the labor used in full-time beekeeping operations was family labor, compared with around 90 percent for the part-time and hobby beekeepers.

As honey production increased, the average amount of labor use per week also increased for all types of beekeeping firms (fig. 14). For full-time beekeepers, average labor use ranged in 1988 from 36 hours per week for firms annually producing less than 1,250 pounds to slightly over 500 hours for honey production of 500,000 pounds or more. Except for the 50,000-249,999 pound size group, part-time beekeepers used significantly less labor than full-time beekeepers, with use ranging from 10 hours for production of less than 1,250 pounds to 41 hours for production of 25,000-49,999 pounds. Hobby beekeepers producing less than 1,250 pounds of honey used an average of 6.9 hours of labor weekly and those producing 1,250-14,999 pounds used 7.7 hours.

For all beekeeping firm types, the average labor use per week increased as beekeeping net income increased, from 24 hours for net incomes of less than $2,500 to 692 hours for net incomes in excess of $99,999 (fig. 15). For beekeepers with negative net

**Table 25--Transportation of honey bee colonies, by firm type, 1985-88**

| Transport colonies to other States | Firm type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Full-time | | | Part-time | | | Hobby | | | Total | | |
| | Number | Average mileage | Mileage per colony | Number | Average mileage | Mileage per colony | Number | Average mileage | Mileage per colony | Number | Average mileage | Mileage per colony |
| Yes | | | | | | | | | | | | |
| 1985 | 103 | 45,539 | 20.0 | 17 | 3,065 | 20.0 | 0 | 0 | 0 | 120 | 39,951 | 20.0 |
| 1986 | 104 | 44,982 | 19.9 | 21 | 5,479 | 35.2 | 1 | 1,000 | 50.0 | 126 | 38,470 | 20.1 |
| 1987 | 108 | 45,982 | 19.6 | 30 | 5,396 | 29.1 | 0 | 0 | 0 | 138 | 37,564 | 19.8 |
| 1988 | 103 | 48,674 | 19.9 | 29 | 6,431 | 26.8 | 0 | 0 | 0 | 132 | 39,576 | 20.1 |
| No | | | | | | | | | | | | |
| 1985 | 187 | 12,475 | 10.5 | 284 | 1,692 | 11.6 | 97 | 80 | 4.1 | 568 | 5,954 | 10.6 |
| 1986 | 186 | 13,360 | 10.8 | 280 | 1,711 | 13.0 | 96 | 86 | 7.1 | 562 | 6,189 | 11.1 |
| 1987 | 182 | 13,318 | 10.5 | 271 | 1,795 | 13.4 | 97 | 58 | 3.9 | 550 | 5,316 | 10.8 |
| 1988 | 187 | 13,701 | 10.6 | 272 | 1,743 | 12.3 | 97 | 74 | 4.7 | 556 | 6,228 | 10.7 |

Sample size = 688 (full-time, 290; part-time, 301; hobby, 97).

Source: 1988 Honey Industry Survey.

**Table 26--Purpose of transporting bee colonies to other States, by firm type, 1985-88**

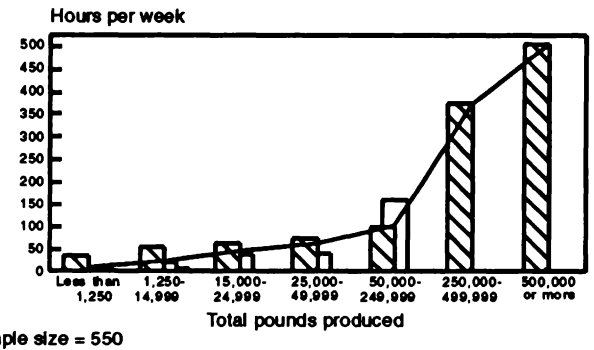
| Purpose | Firm type | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Full-time | | | | Part-time | | | | Hobby | | | | Total | | | |
| | 1985 | 1986 | 1987 | 1988 | 1985 | 1986 | 1987 | 1988 | 1985 | 1986 | 1987 | 1988 | 1985 | 1986 | 1987 | 1988 |
| | *Percent* | | | | | | | | | | | | | | | |
| Paid pollination | 35 | 37 | 37 | 42 | 35 | 38 | 43 | 45 | 0 | 0 | 0 | 0 | 35 | 37 | 38 | 42 |
| Floral source | 36 | 37 | 37 | 35 | 35 | 29 | 23 | 28 | 0 | 0 | 0 | 0 | 36 | 35 | 34 | 33 |
| Wintering | 48 | 48 | 47 | 47 | 41 | 43 | 47 | 45 | 0 | 0 | 0 | 0 | 47 | 47 | 47 | 46 |
| Other | 15 | 14 | 13 | 14 | 6 | 5 | 10 | 3 | 0 | 100 | 0 | 0 | 13 | 13 | 12 | 11 |

Sample size = 153 (full-time, 118; part-time, 34; hobby, 1). Represents beekeepers that answered Yes in table 25.

Source: 1988 Honey Industry Survey.

Figure 14

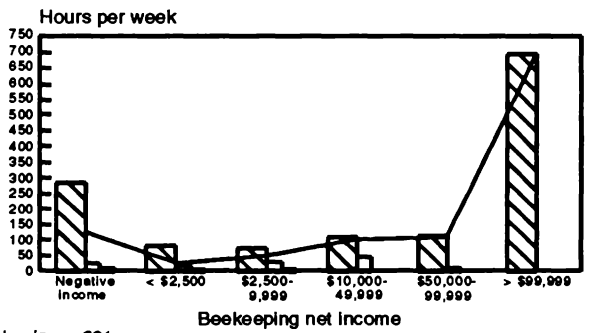
## Average labor use, by firm type and honey production, 1988




Sample size = 550
Source: 1988 Honey Industry Survey.

Figure 15

## Average labor use, by firm type and net income, 1988




Sample size = 601
Source: 1988 Honey Industry Survey.

**Table 27--Beekeeping labor use, by firm type and region, 1988**

| Region and source | Firm type: Full-time (Jan-Mar) | Full-time (Apr-June) | Full-time (July-Sept) | Full-time (Oct-Dec) | Full-time All | Part-time (Jan-Mar) | Part-time (Apr-June) | Part-time (July-Sept) | Part-time (Oct-Dec) | Part-time All | Hobby (Jan-Mar) | Hobby (Apr-June) | Hobby (July-Sept) | Hobby (Oct-Dec) | Hobby All |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Average hours per week* | | | | | | | | | | | | | | |
| Northeast | | | | | | | | | | | | | | | |
| Operator | 36.2 | 54.0 | 55.2 | 36.9 | 45.8 | 9.3 | 20.4 | 18.8 | 14.1 | 16.2 | 0.2 | 1.0 | 1.5 | 1.1 | 1.1 |
| Other family | 19.4 | 18.5 | 18.5 | 13.0 | 17.3 | 4.8 | 3.4 | 3.6 | 3.4 | 3.7 | 0.0 | 0.0 | 0.3 | 0.0 | 0.1 |
| Hired labor | | | | | | | | | | | | | | | |
| Full-time | 19.4 | 26.6 | 27.0 | 23.9 | 24.3 | 0.2 | 0.6 | 0.6 | 0.2 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Part-time | 0.0 | 8.0 | 30.9 | 4.0 | 11.0 | 0.2 | 0.6 | 0.7 | 0.4 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Subtotal | 75.0 | 107.1 | 131.6 | 77.8 | 98.4 | 14.5 | 25.0 | 23.7 | 18.1 | 20.8 | 0.2 | 1.0 | 1.8 | 1.1 | 1.2 |
| Southeast | | | | | | | | | | | | | | | |
| Operator | 36.2 | 49.2 | 47.4 | 35.8 | 42.1 | 19.9 | 24.7 | 22.4 | 16.2 | 21.0 | 5.6 | 1.1 | 8.9 | 5.4 | 8.1 |
| Other family | 13.6 | 25.2 | 22.8 | 10.6 | 18.1 | 4.7 | 6.0 | 5.6 | 4.5 | 5.2 | 0.0 | 2.0 | 0.7 | 0.5 | 0.9 |
| Hired labor | | | | | | | | | | | | | | | |
| Full-time | 18.2 | 23.3 | 28.3 | 16.7 | 21.6 | 0.1 | 0.4 | 0.4 | 0.1 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Part-time | 17.4 | 53.2 | 30.0 | 19.1 | 30.0 | 0.2 | 2.2 | 3.0 | 2.6 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Subtotal | 85.4 | 150.9 | 128.5 | 82.2 | 111.8 | 24.9 | 33.3 | 31.4 | 23.4 | 28.5 | 5.6 | 3.1 | 9.6 | 5.9 | 9.0 |
| Midwest | | | | | | | | | | | | | | | |
| Operator | 30.6 | 49.5 | 52.1 | 38.3 | 42.8 | 9.0 | 20.4 | 26.2 | 15.3 | 18.2 | 2.8 | 5.6 | 10.2 | 4.2 | 5.9 |
| Other family | 11.9 | 21.4 | 28.6 | 17.8 | 20.1 | 1.5 | 5.3 | 6.7 | 3.1 | 4.3 | 4.7 | 0.9 | 2.5 | 1.2 | 2.2 |
| Hired labor | | | | | | | | | | | | | | | |
| Full-time | 68.9 | 82.5 | 77.4 | 66.5 | 74.0 | 0.0 | 1.2 | 0.8 | 0.0 | 0.5 | 0.0 | 0.6 | 0.7 | 0.4 | 0.5 |
| Part-time | 37.4 | 50.3 | 26.4 | 8.7 | 30.9 | 0.3 | 0.8 | 2.7 | 0.7 | 1.2 | 0.0 | 0.6 | 0.7 | 0.4 | 0.5 |
| Subtotal | 148.8 | 203.7 | 184.5 | 131.3 | 167.8 | 10.8 | 27.7 | 36.4 | 19.1 | 24.2 | 7.5 | 7.7 | 14.1 | 6.2 | 9.1 |
| West | | | | | | | | | | | | | | | |
| Operator | 36.0 | 50.7 | 51.7 | 33.4 | 43.0 | 16.2 | 25.4 | 27.7 | 16.3 | 21.5 | 2.5 | 1.0 | 4.4 | 2.8 | 3.4 |
| Other family | 14.8 | 22.6 | 23.2 | 11.6 | 18.1 | 4.1 | 7.8 | 14.3 | 4.3 | 7.7 | 0.0 | 1.5 | 0.8 | 0.0 | 0.6 |
| Hired labor | | | | | | | | | | | | | | | |
| Full-time | 13.8 | 19.7 | 24.6 | 13.7 | 18.0 | 0.0 | 0.0 | 1.8 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Part-time | 4.2 | 14.8 | 21.5 | 2.8 | 10.9 | 0.1 | 0.1 | 0.5 | 0.9 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Subtotal | 68.8 | 107.8 | 121.0 | 61.5 | 90.0 | 20.4 | 33.3 | 44.3 | 21.5 | 30.1 | 2.5 | 2.5 | 5.2 | 2.8 | 4.0 |
| Northwest | | | | | | | | | | | | | | | |
| Operator | 40.8 | 51.8 | 52.4 | 40.5 | 46.6 | 16.3 | 25.3 | 27.2 | 16.7 | 21.7 | 2.3 | 5.4 | 6.1 | 3.0 | 4.6 |
| Other family | 18.4 | 26.6 | 30.4 | 19.5 | 23.9 | 4.0 | 5.8 | 9.2 | 4.6 | 6.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 |
| Hired labor | | | | | | | | | | | | | | | |
| Full-time | 51.7 | 70.7 | 71.3 | 59.0 | 63.5 | 0.0 | 0.3 | 0.3 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Part-time | 5.5 | 59.6 | 78.3 | 6.3 | 38.4 | 18.9 | 2.1 | 2.4 | 0.9 | 5.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Subtotal | 116.4 | 208.7 | 232.4 | 125.3 | 172.4 | 39.2 | 33.5 | 39.1 | 22.2 | 33.5 | 2.3 | 5.5 | 6.1 | 3.0 | 4.6 |
| All regions | | | | | | | | | | | | | | | |
| Operator | 35.8 | 50.6 | 51.6 | 37.7 | 44.1 | 13.4 | 22.6 | 24.8 | 15.6 | 19.4 | 2.8 | 5.6 | 10.2 | 4.2 | 5.9 |
| Other family | 15.0 | 23.7 | 27.0 | 16.0 | 20.5 | 3.3 | 5.6 | 7.4 | 3.7 | 5.1 | 4.7 | 0.9 | 2.5 | 1.2 | 2.2 |
| Hired labor | | | | | | | | | | | | | | | |
| Full-time | 43.7 | 56.5 | 57.0 | 45.7 | 51.0 | 0.0 | 0.7 | 0.8 | 0.0 | 0.4 | 0.0 | 0.6 | 0.7 | 0.4 | 0.5 |
| Part-time | 16.9 | 45.7 | 42.8 | 8.3 | 28.8 | 3.0 | 1.2 | 2.2 | 1.1 | 1.8 | 0.0 | 0.6 | 0.7 | 0.4 | 0.5 |
| Subtotal | 111.4 | 176.5 | 178.4 | 107.7 | 144.4 | 19.7 | 30.1 | 35.2 | 20.4 | 26.7 | 7.5 | 7.7 | 14.1 | 6.2 | 9.1 |

Sample size = 687.

Source: 1988 Honey Industry Survey.

incomes in 1988, weekly labor use averaged 286.5 hours for full-time beekeepers, 27.8 hours for part-time beekeepers, and 10.7 hours for hobbyists.

### *Wage Rates*

The hourly wage rates full-time beekeepers paid to hired labor in 1988 averaged $5.83 for full-time workers and $4.59 for part-time workers (table 28). For part-time beekeepers, the wage rate averaged $1.53 for full-time workers and $3.93 for part-time workers. Unlike full-time beekeepers, part-time beekeepers in all regions paid part-time workers a higher average wage than full-time workers. Since no information was collected on the characteristics of the workers hired, the reason part-time beekeepers paid part-time labor a higher wage rate is unknown. Hobby beekeepers did not report using any hired labor.

## Packers

Honey packers process honey for marketing to commercial or industrial users, wholesale middlemen, and consumers in a variety of containers suitable to the needs of the market. Processing functions may include filtration, blending, and pasteurization. Packers may also transport the honey to wholesalers' warehouses and retail stores.

One group of packers are the cooperative marketing organizations that process, pack, and market their member producers' honey crop. Some cooperatives also purchase honey from nonmembers and importers. A second group of packers called producer-packers are honey producers who process and market part or all of their honey crop. An estimated 40-50 percent of the honey produced in the United States is marketed by producer-packers. Honey products marketed by producer-packers must compete with branded honey marketed with aggressive sales and promotion programs. Consequently, smaller producer-packers frequently confine sales to salesrooms in their home or honey house, roadside stands, farmers' markets, door-to-door contacts, or local stores. A third group of packers are the large, well-organized firms, or bottlers.

These firms have automatic labeling, filling, and capping equipment, and market their honey under an advertised brand or brands. They may also provide private-label packing for retail chains.

Survey questionnaires were obtained from 111 honey packers. Respondents were classified as either full-time packers, part-time producer-packers, or part-time nonproducer-packers. Of the packers completing the survey, 53 percent were classified as part-time producer-packers, 27 percent were part-time nonproducer-packers, and the remaining 20 percent were full-time packers. Nine percent of the packers were female.

## Packer Demographics

### *Headquarters*

Forty-eight packers (43 percent) reported that the Midwest was their primary headquarters (table 29). Thirty-six percent (207) of the responding beekeepers were also headquartered in the Midwest.

### *Age*

About two-thirds of the packers were age 35-54 (fig. 16). The full-time packers were younger, with only 19 percent over age 54, compared with about 37 percent for the part-time producer-packers and nonproducer-packers.

### *Education*

Only 8 percent of the packers had less than a high school education (fig. 17). Over 60 percent of the packers attended college, with 37 percent attending at least 4 years.

### *Residence*

Fifty-four percent of the packers indicated that their primary residence was in a rural area (table 30). Of the re-

**Table 28—Average wage rate paid for hired labor, by firm type and region, 1988**

| Firm type | Region | | | | | | | | | | All regions | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Northeast[1] | | Southeast[2] | | Midwest[3] | | West[4] | | Northwest[5] | | | |
| | Full-time workers | Part-time workers | Full-time workers | Part-time workers | Full-time workers | Part-time workers | Full-time workers | Part-time workers | Full-time workers | Part-time workers | Full-time workers | Part-time workers |
| | *Dollars per hour* | | | | | | | | | | | |
| Full-time | 8.19 | 5.06 | 4.79 | 4.04 | 5.71 | 4.64 | 5.45 | 4.81 | 6.19 | 4.61 | 5.83 | 4.59 |
| Part-time | 1.92 | 3.14 | 1.38 | 2.71 | 1.00 | 3.24 | 3.00 | 9.28 | 1.67 | 4.49 | 1.53 | 3.93 |
| Hobby | [6] | [6] | [6] | [6] | [6] | [6] | [6] | [6] | [6] | [6] | [6] | [6] |

Sample size = 687.
[1]CT,MA,MD,ME,NH,NH,NY,PA,VT,DE,RI.
[2]AL,AR,GA,FL,LA,MO,MS,NC,SC,TN,VA,WV.
[3]IA,IL,IN,KS,KY,MI,MN,OH,WI,OK,TX.
[4]AZ,CO,CA,NM,NV,UT,WY,HI.
[5]AK,ID,MT,ND,NE,OR,SD,WA.
[6]The hobbyists did not report any wage rates.

Source: 1988 Honey Industry Survey.

**Table 29—Packers, by firm type and region, 1988**

| Region | Firm type: Full-time | Part-time: Producer-packer | Part-time: Nonproducer-packer | Total |
|---|---|---|---|---|
| | *Number* | | | |
| Northeast[1] | 3 | 4 | 4 | 11 |
| Southeast[2] | 5 | 11 | 5 | 21 |
| Midwest[3] | 7 | 26 | 15 | 48 |
| West[4] | 6 | 12 | 0 | 18 |
| Northwest[5] | 1 | 6 | 6 | 13 |
| Total | 22 | 59 | 30 | 111 |

Sample size = 111.
[1]CT,MA,MD,ME,NH,NH,NY,PA,VT,DE,RI.
[2]AL,AR,GA,FL,LA,MO,MS,NC,SC,TN,VA,WV.
[3]IA,IL,IN,KS,KY,MI,MN,OH,WI,OK,TX.
[4]AZ,CO,CA,NM,NV,UT,WY,HI.
[5]AK,ID,MT,ND,NE,OR,SD,WA.

Source: 1988 Honey Industry Survey.

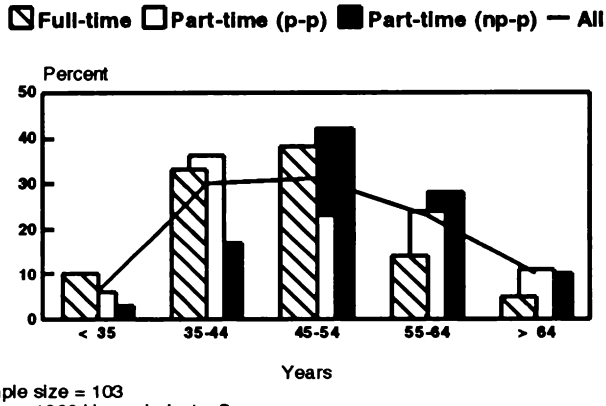
**Table 30—Packer location of primary residence, by firm type, 1988**

| Location | Firm type: Full-time | Part-time: Producer-packer | Part-time: Nonproducer-packer | Total |
|---|---|---|---|---|
| | *Percent* | | | |
| Farm | 5 | 36 | 45 | 32 |
| Rural, but not farm | 19 | 25 | 21 | 22 |
| Community | | | | |
| Less than 2,500 | 9 | 16 | 14 | 14 |
| 2,500-24,999 | 24 | 12 | 14 | 15 |
| 25,000-49,999 | 0 | 7 | 0 | 4 |
| 50,000-99,999 | 24 | 0 | 3 | 6 |
| 100,000 or more | 19 | 4 | 3 | 7 |
| Total | 100 | 100 | 100 | 100 |

Sample size = 106.

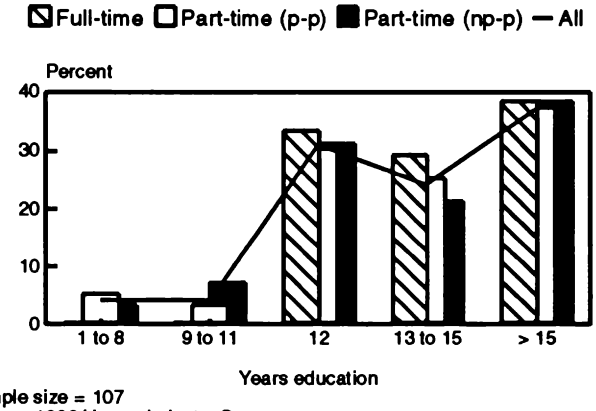
Source: 1988 Honey Industry Survey.

Figure 16
## Age distribution of packers, by firm type, 1988




Sample size = 103
Source: 1988 Honey Industry Survey.

Figure 17
## Distribution of packers, by firm type and years education, 1988




Sample size = 107
Source: 1988 Honey Industry Survey.

maining packers who resided in a community, 63 percent resided in a community of less than 25,000 population.

### *Family Size*

Full-time packers had an average household size of 3.3 family members, compared with 3 for part-time packers (table 31). Nearly 70 percent of the full-time packers had children 18 years of age or younger in their households, compared with 56 percent of the part-time packers.

### *Occupation*

Slightly over 80 percent of the full-time packers listed their occupation as either "own business" or "managerial" (table 32). For the part-time packers, 56 percent of the producer-packers listed their occupation as "beekeeping," while 66 percent of the nonproducer-packers listed either "laborer," "own business," "technician," or "retired."

### *Honey Packed*

The volume of domestic honey packed, including owned production and purchased honey, increased between 1985 and 1988, from 18.7 to 27.2 million pounds (table 33). Part of this volume increase, however, was due to the increase in packers reporting, up from 61 in 1985 to 77 in 1988. The average volume of domestic honey packed increased from 305,847 pounds per packer in 1985 to 353,849 pounds in 1988. About 98 percent of the domestic honey was packed by full-time packers.

The volume of foreign honey packed by the packers surveyed declined from 6.8 million to 4.0 million pounds from 1986 to 1988. The part-time packers reported no foreign honey packed after 1986. The decline in packing of foreign honey after 1986 was likely the result of the changes to the honey price

**Table 31--Average size of packer households, by firm type and age, 1988**

| Age of household members | Firm type: Full-time | | Part-time: Producer-packer | | Part-time: Nonproducer-packer | | Total | |
|---|---|---|---|---|---|---|---|---|
| | Number reporting | Number reported | Number reporting | Number reported | Number reporting | Number reported | Number reporting | Number reported |
| Under 6 years | 4 | 8 | 10 | 14 | 3 | 4 | 17 | 26 |
| 6-12 years | 4 | 7 | 11 | 18 | 4 | 9 | 19 | 34 |
| 13-18 years | 5 | 6 | 11 | 17 | 5 | 6 | 21 | 29 |
| 19 or older[1] | 19 | 42 | 51 | 108 | 28 | 59 | 98 | 209 |
| Total | 19 | 63 | 51 | 157 | 28 | 78 | 98 | 298 |
| Average | NA | 3.3 | NA | 3.0 | NA | 2.7 | NA | 3.0 |

Sample size = 98.
[1]All household members, including adults.

Source: 1988 Honey Industry Survey.

**Table 32--Major occupation of packers, by firm type, 1988**

| Occupation | Firm type: Full-time | Part-time: Producer-packer | Part-time: Nonproducer-packer | Total |
|---|---|---|---|---|
| | *Percent* | | | |
| Clerical | 0 | 0 | 3 | 1 |
| Professional | 5 | 14 | 11 | 11 |
| Managerial | 24 | 3 | 0 | 7 |
| Technician | 0 | 6 | 14 | 7 |
| Laborer | 0 | 2 | 21 | 7 |
| Own business | 57 | 11 | 17 | 21 |
| Sales | 0 | 2 | 3 | 2 |
| Beekeeping | 5 | 56 | 3 | 31 |
| Farmer | 0 | 0 | 3 | 1 |
| Retired | 0 | 3 | 14 | 5 |
| Other | 9 | 3 | 11 | 7 |
| Total | 100 | 100 | 100 | 100 |

Sample size = 107.

Source: 1988 Honey Industry Survey.

support program contained in the 1985 farm legislation. Among these changes was the lower loan repayment option, which reduced forfeitures of domestic honey to the Government, and the substitution of foreign honey for domestic honey in the market.

Only six full-time packers reported subcontracting packing services for other businesses during 1985-88 (table 34). However, the average volume of subcontracted domestic honey packed per firm ranged from 3.3 million pounds in 1988 to 6.1 million pounds in 1987. The volume of subcontracted foreign honey packed declined significantly to only 450,000 pounds in 1987 and 1988.

The average cost of the domestic honey packed between 1985 and 1988 by all packers ranged between 38-40 cents per pound. The cost of the foreign honey was slightly higher, ranging from 40 to 44 cents.

## Packer Financial Characteristics

### *Total Assets*

Nearly 80 percent of the full-time packers reported owning assets in their packing operations totaling over $150,000 in 1988 (fig. 18). The asset value of over 25 percent of the full-time packers and 4 percent of the part-time packers exceeded $1 million. The part-time nonproducer-packers reported few assets in their operations, with about one-third having less than $5,000 of assets and one-third having less than $20,000 of assets. About 55 percent of the part-time producer-packers had total assets of $20,000-$149,999.

### *Total Debts*

About 45 percent of the packers had no debts on their packing operations (fig. 19). Full-time packers had the

**Table 33--Volume and cost of honey packed, by firm type and source, 1985-88**

| Honey source | Firm type: Full-time | | Part-time: Producer-packer | | Part-time: Nonproducer-packer | | Total | |
|---|---|---|---|---|---|---|---|---|
| | Volume | Cost | Volume | Cost | Volume | Cost | Volume | Cost |
| | *Pounds* | *Cents/pound* | *Pounds* | *Cents/pound* | *Pounds* | *Cents/pound* | *Pounds* | *Cents/pound* |
| Owned | | | | | | | | |
| 1985 | 94,488 | [1] | 722,861 | [1] | 82,075 | [1] | 899,424 | [1] |
| 1986 | 127,430 | [1] | 733,931 | [1] | 95,843 | [1] | 957,204 | [1] |
| 1987 | 1,122,965 | [1] | 1,024,782 | [1] | 90,424 | [1] | 2,238,171 | [1] |
| 1988 | 133,030 | [1] | 1,264,618 | [1] | 107,409 | [1] | 1,505,057 | [1] |
| Domestic | | | | | | | | |
| 1985 | 18,492,607 | 40 | 164,075 | 51 | [2] | [2] | 18,656,682 | 40 |
| 1986 | 20,680,625 | 44 | 245,051 | 44 | 1,962 | 55 | 20,927,638 | 44 |
| 1987 | 23,426,008 | 42 | 749,923 | 42 | 6,540 | 51 | 24,182,471 | 42 |
| 1988 | 26,190,444 | 41 | 1,042,879 | 41 | 13,119 | 51 | 27,246,442 | 41 |
| Foreign | | | | | | | | |
| 1985 | 5,380,281 | 42 | 41,580 | 47 | [2] | [2] | 5,421,861 | 42 |
| 1986 | 6,712,684 | 43 | 46,319 | 50 | [2] | [2] | 6,759,003 | 43 |
| 1987 | 4,710,982 | 44 | [2] | [2] | [2] | [2] | 4,710,982 | 44 |
| 1988 | 3,978,465 | 44 | [2] | [2] | [2] | [2] | 3,978,465 | 44 |

Sample size = (1985, 61; 1986, 65; 1987, 74; 1988, 77).
[1]No price reported for owned honey.
[2]None reported or insufficient respondents to avoid disclosure.

Source: 1988 Honey Industry Survey.

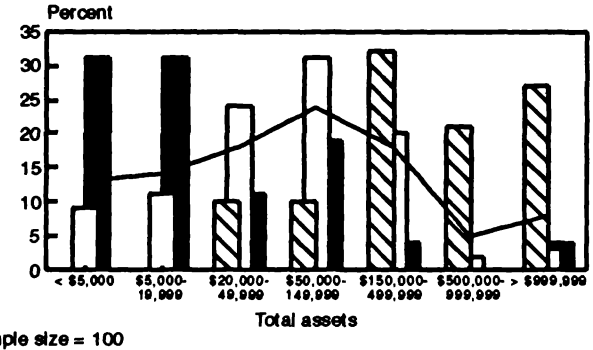
**Table 34--Volume and cost of subcontracted honey packed, by firm type and source, 1985-88**

| Honey source | Type firm: Full-time | | Part-time: Producer-packer | | Part-time: Nonproducer-packer | | Total | |
|---|---|---|---|---|---|---|---|---|
| | Volume | Cost | Volume | Cost | Volume | Cost | Volume | Cost |
| | Pounds | Cents/pound | Pounds | Cents/pound | Pounds | Cents/pound | Pounds | Cents/pound |
| Domestic | | | | | | | | |
| 1985 | 29,614,230 | 40 | [1] | [1] | [1] | [1] | 29,614,230 | 40 |
| 1986 | 33,959,974 | 40 | [1] | [1] | [1] | [1] | 33,959,974 | 40 |
| 1987 | 36,485,368 | 38 | [1] | [1] | [1] | [1] | 36,485,368 | 38 |
| 1988 | 19,510,566 | 39 | [1] | [1] | [1] | [1] | 19,510,566 | 39 |
| Foreign | | | | | | | | |
| 1985 | 7,715,000 | 44 | [1] | [1] | [1] | [1] | 7,715,000 | 44 |
| 1986 | 6,483,000 | 44 | [1] | [1] | [1] | [1] | 6,483,000 | 44 |
| 1987 | 450,000 | 40 | [1] | [1] | [1] | [1] | 450,000 | 40 |
| 1988 | 450,000 | 40 | [1] | [1] | [1] | [1] | 450,000 | 40 |

Sample size = (1985, 5; 1986, 6; 1987, 6; 1988, 6).
[1]None reported or insufficient respondents to avoid disclosure.

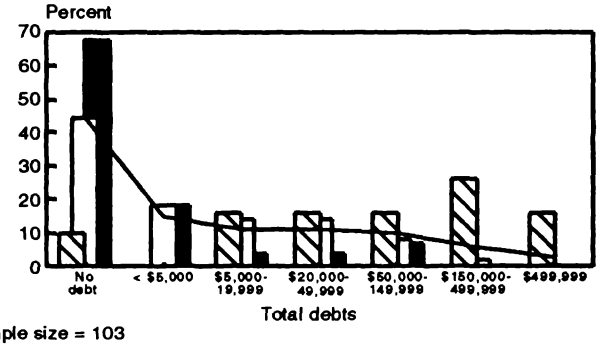
Source: 1988 Honey Industry Survey.

Figure 18
**Distribution of packers, by firm type and total assets, 1988**



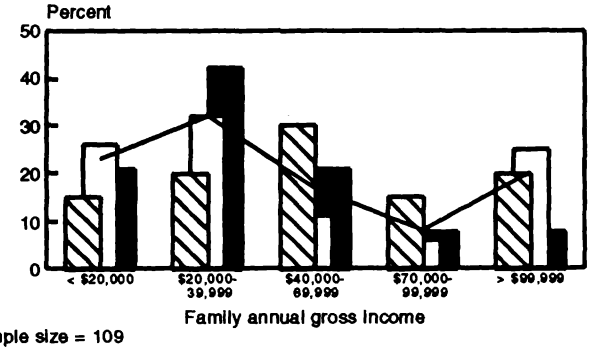

Sample size = 100
Source: 1988 Honey Industry Survey.

Figure 19
**Distribution of packers, by firm type and total debts, 1988**



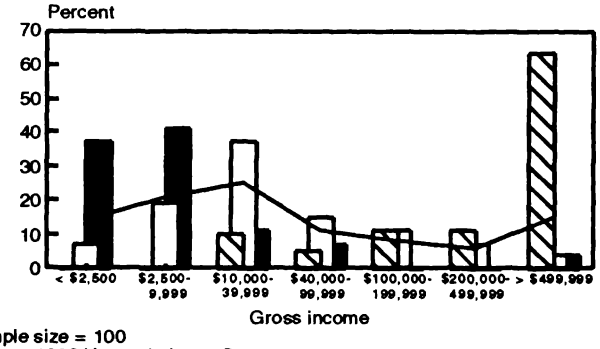

Sample size = 103
Source: 1988 Honey Industry Survey.

Figure 20
**Distribution of packers, by firm type and family income, 1988**




Sample size = 109
Source: 1988 Honey Industry Survey.

Figure 21
**Distribution of packers, by firm type and gross income, 1988**




Sample size = 100
Source: 1988 Honey Industry Survey.

highest level of debts, with 42 percent exceeding $149,999. About 67 percent of the part-time nonproducer-packers had no debt in 1988.

### *Family Annual Gross Income*

Sixty-five percent of the full-time packers had household incomes of $40,000 or more in 1988 compared with 42 percent of the part-time producer-packers and 38 percent of the part-time nonproducer-packers (fig. 20). About 20 percent of all the packers reporting had household incomes of $100,000 or more.

### *Gross Income*

Over 60 percent of the full-time packers had gross incomes from their packing operations above $500,000 in 1988 (fig. 21). Seventy-eight percent of the part-time nonproducer-packers and 26 percent of the part-time producer-packers had gross incomes under $10,000. No full-time packer reported a gross income of less than $10,000.

### *Gross Expenses*

The cost of packing honey, excluding the cost of honey purchases, for full-time packers surveyed averaged 19 cents a pound in 1988 (table 35). Labor and supplies each accounted for 5 cents of this cost. Since the full-time packers handled 98 percent of the domestic honey packed and nearly all the foreign honey packed, the weighted cost for all the full-time and part-time packing operations averaged close to that of the full-time packers, at 23 cents a pound.

Part-time producer-packers averaged 70 cents more in gross expenses per pound than full-time packers. In-

**Table 35—Average gross expenses of packing operations, by firm type, 1988**

| Cost item | Firm type: Full-time | Part-time: Producer-packer | Part-time: Nonproducer-packer | Total |
|---|---|---|---|---|
| | *Dollars/pound* | | | |
| Labor | 0.05 | 0.26 | 0.16 | 0.06 |
| Hired labor | 0.02 | 0.17 | 0.16 | 0.03 |
| Benefits | 0.01 | 0.02 | 0.00 | 0.01 |
| Other | 0.02 | 0.07 | -- | 0.02 |
| Bees | 0.00 | 0.07 | 0.16 [1] | -- |
| Bee food | 0.00 | 0.02 | 0.05 [1] | -- |
| Queens and nucleus colonies | 0.00 | 0.01 | 0.03 [1] | -- |
| Package bees | 0.00 | 0.04 | 0.08 [1] | -- |
| Supplies | 0.05 | 0.22 | 0.39 | 0.06 |
| Equipment | 0.01 | 0.07 | 0.12 | 0.01 |
| Repairs/maint. | -- | 0.03 | 0.04 | -- |
| Gas and oil | -- | 0.04 | 0.08 | 0.01 |
| Buildings | 0.01 | 0.10 | 0.10 | 0.01 |
| Repairs/maint. | -- | 0.02 | 0.01 | -- |
| Mortgage | -- | 0.08 | 0.09 | 0.01 |
| Overhead | 0.03 | 0.13 | 0.16 | 0.04 |
| Utilities | 0.01 | 0.03 | 0.05 | 0.01 |
| Insurance | 0.01 | 0.03 | 0.03 | 0.01 |
| Taxes | -- | 0.03 | 0.04 | -- |
| Rent | -- | 0.02 | 0.02 | 0.01 |
| Interest | 0.01 | 0.01 | 0.02 | 0.01 |
| Other | -- | 0.01 | -- | -- |
| Marketing | 0.01 | 0.02 | 0.02 | 0.02 |
| Advertising | -- | 0.01 | 0.01 | -- |
| Subscriptions | -- | -- | -- | -- |
| Promotion | -- | -- | 0.01 | -- |
| Fees | 0.01 | -- | 0.00 | 0.01 |
| Other | 0.03 | 0.02 | 0.01 | 0.03 |
| Total | 0.19 | 0.89 | 1.12 | 0.23 |

Sample size = 72.
-- = Less than 1 cent a pound.
[1]Several part-time packers classified themselves as nonproducers, but reported expenses for bees. It is assumed these packers operated a few bees as a hobby.

Source: 1988 Honey Industry Survey.

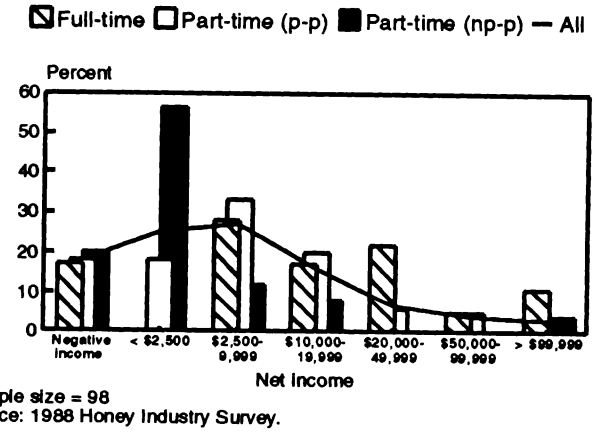
cluded in the gross expenses of the part-time producer-packers, however, is the cost of producing honey. Labor, at 26 cents a pound, and supplies, at 22 cents, were also significant costs incurred by the part-time producer-packers.

Gross expenses of the part-time nonproducer-packers averaged $1.12 a pound in 1988. This estimate, however, is probably high since it appears that some of the nonproducer-packers reported expenditures for bees that they may have maintained as a hobby. The gross expenses would average about 96 cents a pound if these bee expenses were excluded. The major cost items were supplies, labor, and overhead.

### *Net Income*

About 70 percent of the packers had a net income (gross income less gross operating expenses) of less than $10,000 in 1988 (fig. 22). Nine percent of the

Figure 22
**Distribution of packers, by firm type and net income, 1988**




Sample size = 98
Source: 1988 Honey Industry Survey.

part-time packers had a net income of $20,000 or more, compared with 40 percent of the full-time packers.

### Importers and Brokers

The trading segment of the honey industry is composed of a small group of middlemen that either buy bulk honey or processed (filtered, pasteurized, and packaged) honey for their own account or for resale or that represent a honey buyer or seller for a brokerage fee. For this study, a honey importer is defined as a middleman who buys honey for his own account and resells to industrial users and other middlemen. A honey broker is also a middleman, but receives a brokerage fee to buy or sell lots of honey for another party. It is not uncommon, however, for individuals or firms within the industry to engage in a variety of marketing activities as profitable opportunities arise.

Completed survey schedules were obtained from 17 importers and/or brokers. The respondents were further classified as either full-time or part-time. Eight of the respondents indicated they were full-time importers, four were full-time brokers, two were full-time importers and brokers, and the remaining three were part-time importers. Two of the full-time importers and brokers were female. Due to the limited number of importers and brokers responding to the honey industry survey, the 14 full-time importers and brokers were analyzed in this study as one group and the three part-timers were omitted.

### Importer and Broker Demographics

#### *Headquarters*

The headquarters of the 14 full-time importers and/or brokers were located throughout the United States, with 6 located in the Northeast, 1 in the Southeast, 1 in the Midwest, 3 in the West, and 3 in the Northwest.

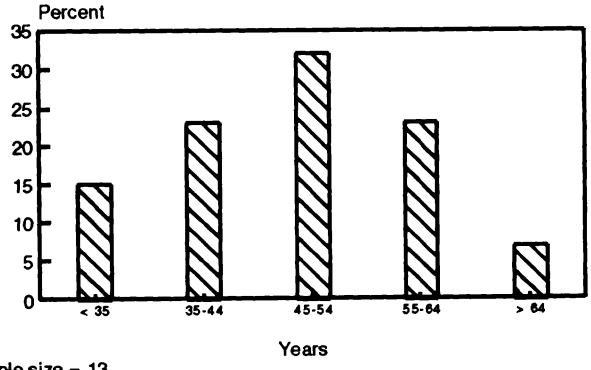
#### *Age*

About one-third of the 13 full-time importers and/or brokers reporting their age were 45-54 (fig. 23). Twenty-three percent were 35-44 and another 23 percent were 55-64. Only 7 percent of the importers and/or brokers were older than 64.

#### *Education*

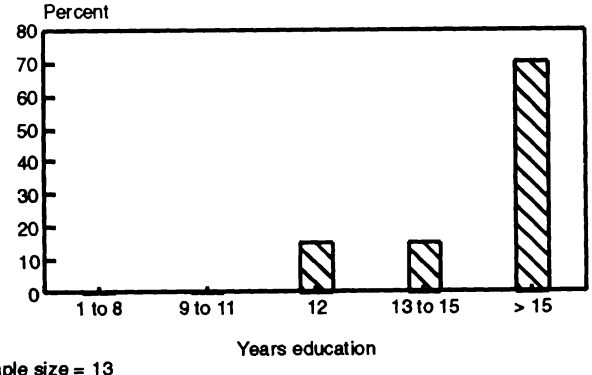
All 13 full-time importers and/or brokers had at least 12 years of education (fig. 24). Eighty-five percent had attended college and 70 percent had more than 3 years of college.

Figure 23
**Distribution of importers and brokers, by age class, 1988**




Sample size = 13
Source: 1988 Honey Industry Survey.

Figure 24
**Distribution of importers and brokers, by years education, 1988**




Sample size = 13
Source: 1988 Honey Industry Survey.

#### *Residence*

Ninety-two percent of the 13 importers and/or brokers resided in a community of 2,500 or more population, with half residing in communities having over 50,000 population (table 36).

#### *Family Size*

The 12 full-time importers and/or brokers reporting household size had an average of 2.9 family members, compared with 3 for packers and 3.1 for all beekeepers surveyed (table 37). Only 1 importer and/or broker had children under age 6 and 1 had children age 6-12.

#### *Occupation*

About three-fourths of the 13 importers and/or brokers reporting their occupation indicated they either owned

**Table 36—Importer and/or broker location of primary residence, 1988**

| Location | Full-time |
|---|---|
| | *Percent* |
| Farm | 0 |
| Rural, but not farm | 8 |
| Community | |
| Less than 2,500 | 8 |
| 2,500-24,999 | 31 |
| 25,000-49,999 | 0 |
| 50,000-99,999 | 22 |
| 100,000 or more | 31 |
| Total | 100 |

Sample size = 13.

Source: 1988 Honey Industry Survey.

**Table 37—Average size of importer and/or broker households, by age, 1988**

| Age of household members | Full-time | |
|---|---|---|
| | Number reporting | Number reported |
| Under 6 years | 1 | 2 |
| 6-12 years | 1 | 2 |
| 13-18 years | 3 | 5 |
| 19 or older | 12 | 26 |
| Total | 12 | 35 |
| Average | N.A. | 2.9 |

N.A. = Not applicable.
Sample size = 12.

Source: 1988 Honey Industry Survey.

their own business or were in a managerial position (table 38). The remainder of the respondents were either in sales, other jobs, or retired.

## Importer and Broker Financial Characteristics

### *Total Assets*

Five importers and/or brokers (55 percent) reported assets in their beekeeping operations totaling $1 million or more at the end of 1988 (fig. 25). The remaining four importers and/or brokers reported total assets of at least $50,000.

### *Total Debts*

Half of the importers and/or brokers reporting debt had outstanding debts at the end of 1988 totaling $500,000 or more (fig. 26). Twelve percent reported having no debt.

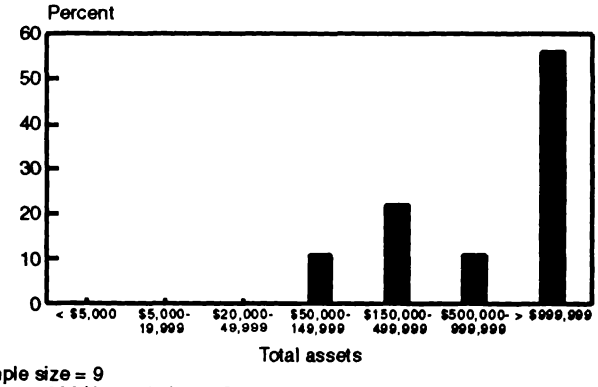
**Table 38—Major occupation of importers and/or brokers, 1988**

| Occupation | Full-time |
|---|---|
| | *Percent* |
| Clerical | 0 |
| Professional | 0 |
| Managerial | 30 |
| Technician | 0 |
| Laborer | 0 |
| Own business | 46 |
| Sales | 8 |
| Beekeeping | 0 |
| Farmer | 0 |
| Retired | 8 |
| Other | 8 |
| Total | 100 |

Sample size = 13.

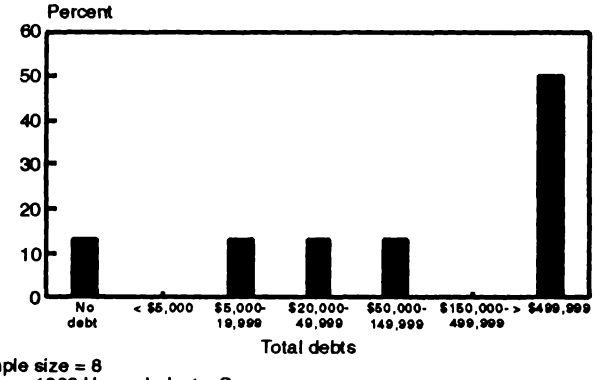
Source: 1988 Honey Industry Survey.

Figure 25
**Distribution of importers and brokers, by total assets, 1988**




Sample size = 9
Source: 1988 Honey Industry Survey.

Figure 26
**Distribution of importers and brokers, by total debts, 1988**




Sample size = 8
Source: 1988 Honey Industry Survey.

### *Family Annual Gross Income*

Fifty-four percent of the importers and/or brokers had gross family incomes in 1988 of $100,000 or more (fig. 27). All the importers and/or brokers had family incomes of at least $20,000.

### *Gross Income*

Nine of the ten importers and/or brokers reporting indicated they received gross incomes of $500,000 or more from their honey operations in 1988 (fig. 28). Although this finding may seem inconsistent with the data shown in figure 27 where 46 percent had family incomes less than $100,000, it is likely that only the net income from the beekeeping operation was considered as family income.

### *Net Income*

Five of the importers and/or brokers reporting (55 percent) had net incomes of $100,000 or more from their honey operations in 1988 (fig. 29). One (11 percent) had a negative net income.

### *Negotiated Products*

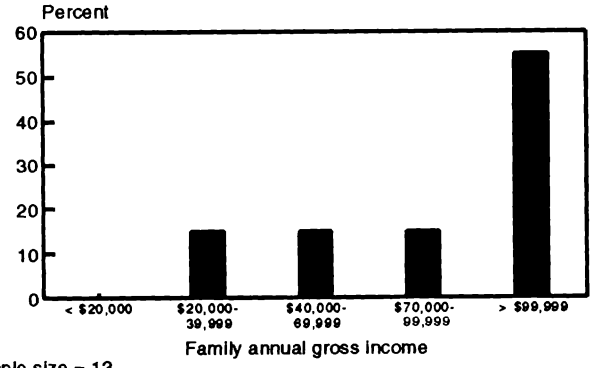
Several of the full-time importers and/or brokers indicated they negotiated to buy or sell products in addition to honey. Four of the full-time importers and/or brokers handled other sweeteners, eight handled other agricultural products, and six dealt with nonagricultural products.

## Honeybee Pollination[3]

Many agricultural crops depend on honeybees for pollination to achieve commercial yields (table 39). Others, while not dependent on bees, produce higher yields if honeybees are present. Increased yields boost production and eventually reduce food costs to consumers. McGregor (1976) estimates that 15 percent of the plant-derived portion of the human diet comes from plants dependent upon, or helped by, insect pollination and that about one-third of the human diet is derived directly or indirectly from insect-pollinated plants. Honeybees also pollinate ornamentals, spices and plants that provide food and shelter for wildlife and help control soil erosion.

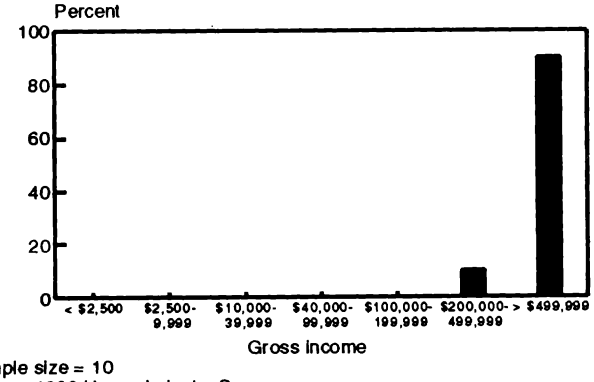
[3]This section draws partly from research by Willard S. Robinson, Richard Nowogrodzki, and Roger A. Morse, Department of Entomology, Cornell University, conducted under cooperative agreement 58-3AEK-9-80004 with the Economic Research Service, U.S. Department of Agriculture, with funds established by the National Honey Board. The section also summarizes results of other published information on honeybee pollination.

Figure 27
**Distribution of importers and brokers, by family income, 1988**



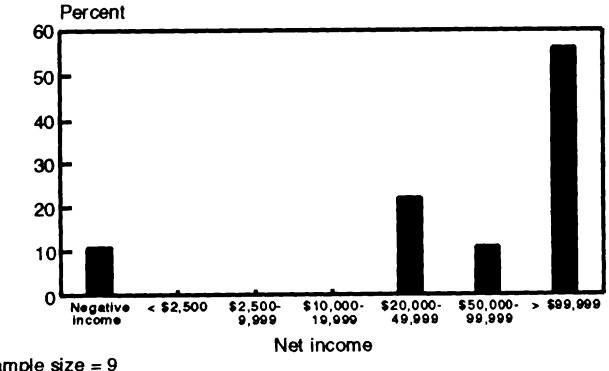

Sample size = 13
Source: 1988 Honey Industry Survey.

Figure 28
**Distribution of importers and brokers, by gross income, 1988**




Sample size = 10
Source: 1988 Honey Industry Survey.

Figure 29
**Distribution of importers and brokers, by net income, 1988**




Sample size = 9
Source: 1988 Honey Industry Survey.

**Table 39--Crops pollinated by honeybees**

| Crop | Crops dependent[1] | | Crops increased[2] | |
|---|---|---|---|---|
| Fruits and nuts | Almond | Orange | Apple | Mandarin |
| | Apple--most varieties | Peach--some varieties | Apricot | Mango |
| | Apricot--some varieties | Pear--most varieties | Bushberry | Nectarine |
| | Avocado | Plum | Blackberry | Passion fruit |
| | Cherry | Prune | Blueberry | Peach |
| | Chestnut | Tangelo | Cranberry | Pear |
| | Grapefruit | Tangerine | Dewberry | Persimmon |
| | Lychee fruit | Tung | Gooseberry | Raspberry |
| | | | Huckleberry | Strawberry |
| | | | Macadamia nut | |
| Forage seed | Alfalfa | Ladino clover | Crimson clover | |
| | Alsike | Red clover | | |
| | Berseem | Sanfoin | | |
| | Birdsfoot trefoil | Crownvetch | | |
| Vegetable seed | Asparagus | Kohlrabi | Eggplant | |
| | Broccoli | Leek | Pepper | |
| | Brussels sprouts | Melon | | |
| | Cabbage | Mustard | | |
| | Carrot | Onion | | |
| | Cauliflower | Parsley | | |
| | Celery | Parsnip | | |
| | Chinese cabbage | Pumpkin | | |
| | Collards | Radish | | |
| | Cucumber | Rutabaga | | |
| | Kale | Squash | | |
| Vegetables | Cucumber | Pumpkin | | |
| | Melon | Squash | | |
| Oilseed | | | Flaxseed | |
| | | | Rape | |
| | | | Safflower | |
| Tree seed | Catalpa | Yellow poplar | | |
| | Black locust | Holly | | |
| | Red maple | | | |

[1]Cross-pollination needed to produce a commercial crop.
[2]A larger crop is generally produced when bee-pollinated.

Source: Stanger, W. (1967).

Although wind and gravity are also important external agents of pollination, many fruit, vegetable, and seed crops depend primarily on insects for assistance in reproduction. While many kinds of insects feed on nectar and pollen, only bees are important pollinators.

### Commercial Crop Pollination

Of at least 5,000 species of bees in North America, only the alkali, leafcutter, and honeybee are important pollinators of commercial crops. Due to their highly specific nesting, foraging, and environmental requirements, however, alkali and leafcutter bees are only effective pollinators of alfalfa for seed. Honeybees have proven much more practical than "wild" bees for commercial pollination and provide an estimated 80 percent of the insect pollination services to crops.

Unlike other bees, honeybees live in populous colonies that can be transported to crops needing pollination and concentrated at whatever density is desired. The perennial nature of honeybee colonies, combined with their year-round availability from queen and package bee producers, provides a striking contrast to the short active season of most wild bees. The honeybee's food hoarding, its attraction to a single flower species on a given foraging trip, and the ability of a colony to use many different flower species as food sources also contribute to the superiority of honeybees as commercial pollinators. Honeybees produce marketable products that provide an incentive for their cultivation that has ensured that colonies are plentiful and available when needed for pollination.

Achieving maximum yield and optimum quality of many crops requires more insect pollinators than are naturally present in the area at flowering time. Since bee colonies can be easily concentrated when and where needed, some beekeepers rent their colonies to crop producers one or more times each year to provide

pollination. Other beekeepers supply pollination free as a byproduct of their honey-producing activities.

### *Colony Rentals*

Most pollination services rented to crop producers are provided by large full-time beekeepers. Hobbyists and part-time beekeepers generally do not provide pollination services for rent because they cannot economically justify investment in equipment to transport honeybees from one pollination site to another.

Robinson, Nowogrodzki, and Morse (1989) estimate that more than 2 million rentals of honeybee colonies for pollination of major crops occur each year (table 40). Many colonies are used on two different crops in the same year, and a small number pollinate three crops. Thus, about 1 million colonies of honeybees, about 25-30 percent of all colonies in the United States and 50 percent of the commercial colonies, are estimated to be involved in rental pollination.

This estimate of the number of colonies rented is substantially higher than other published estimates. Oertel (1983) estimated about 500,000 hive rentals annually for pollination, and Levin (1986) estimated about 10-15 percent of the Nation's colonies (that is, about 300,000-450,000 hives) are used for commercial pollination.

Pollination fees vary across the country by crop and geographical area, ranging from $9.50 per colony (Burgett, 1988) to $35 per colony (Mayer, 1988) in 1988. Assuming a national average of $20 per colony, the fees paid for the 2.035 million rentals shown in table 40 would total around $40.7 million.

The general trends are for increased acreage and production for most of the crops that benefit from pollination. More food will be needed for the growing U.S. population, which was 226.5 million in 1980 and is projected to reach 267.5 million by the end of the century. Also, the marked upward trend in per capita consumption of many fruits and vegetables is expected to persist. As production of these crops grows, and as the value of increased densities of pollinating insects is more fully appreciated by growers, the demand for honeybees for pollination of agricultural crops will almost surely continue to increase into the next century.

### *Valuing Honeybee Pollination*

The value of production inputs, such as bee pollination services, is typically based on the amount used and the value of the added output resulting from the last unit employed. The customary method for estimating an input's value is to multiply the quantity used times its price (which is assumed to approximate the value

**Table 40—Estimates of total numbers of honeybee colonies rented annually in California and the United States for pollination**

| Crop | Major producing states | Annual colony rentals | | Number of colonies per acre | |
|---|---|---|---|---|---|
| | | California | United States | Recommended | Actual |
| Almond | CA | 650,000 | 650,000 | 2-5 | 1.5-5 |
| Apple | WA,NY,MI,CA,PA | 30,000 | 250,000 | 1-2 | 0.25-2 |
| Melon | CA,TX,FL | 200,000 | 250,000 | 1-2 | 1-2 |
| Alfalfa seed | CA,ID,WA,OR,NV | 200,000 | 220,000 | 1-10 | 3-10 |
| Plum/prune | CA,OR,MI,WA,ID | 125,000 | 145,000 | 1 | 1-2 |
| Avocado | CA | 100,000 | 100,000 | 2-3 | 1-2 |
| Blueberry | MI,ME,NJ,NC,GA | 0 | 75,000 | 0.5-10 | 1-3 |
| Cherry | WA,MI,OR,CA | 10,000 | 70,000 | 1-2 | 0.33-2 |
| Vegetable seed[1] | CA,OR,WA,others | 35,000 | 50,000 | variable | 1-10[3] |
| Pear | CA,WA,OR | 12,000 | 50,000 | 1-2 | 1[4] |
| Cucumber | NC,MI,SC,FL,TX | 5,000 | 40,000 | 1-3 | 0.1-3 |
| Sunflower[5] | CA,TX,MN | 15,000 | 40,000 | 0.5-1 | 0.67-1 |
| Cranberry | MA,WI,NJ,OR,WA | 0 | 30,000 | 1 | 1-1.5 |
| Kiwifruit | CA | 15,000 | 15,000 | 3-5 | 1-5 |
| Others[6] | Throughout United States | 35,000 | 50,000 | variable | variable |
| Totals | | 1,432,000 | 2,035,000 | | |

[1]Includes seeds for cole, cucurbits, celery, carrot, radish, and onion.
[2]California totals for these crops estimated as 70 percent of U.S. totals.
[3]1-2 colonies per acre for most vegetable seeds; up to 10 colonies per acre for onion seed.
[4]Except in central California, where few, if any, colonies are rented for the pear crop because it consists almost exclusively of the cultivar Bartlett, which generally sets seedless fruit under warm climatic conditions.
[5]For production of hybrid seeds.
[6]Includes squash, pumpkin, brambleberries (blackberry, boysenberry, loganberry, and raspberry), strawberry, peach, nectarine, macadamia nut, holly, buckwheat, rapeseed, some citrus, some soybean varieties, and seeds for forage legumes other than alfalfa.

Source: Robinson, W., Nowogrodzki, R., and Morse, R. (1989).

of added output from the last unit employed). Under conditions representative of agricultural production, this approach assures that the sum of the values of all production inputs exactly equals the market value of the output. If $20 per colony rental represents the input price and 2.035 million rentals represents the quantity (see *Colony Rentals* section), the value of purchased honeybee pollination services is $40.7 million.

Although the above procedure provides an appropriate value for purchased pollination services, it does not include the value of pollination provided free as a byproduct of honey production. As in the case of purchased inputs, the customary methods for valuing nonpurchased benefits, such as free honeybee pollination, also depend on the added value from the last unit employed.[4]

### Other Pollination Contributions

While research has documented that honeybee pollination is a vital part of our commercial food production system, honeybees also contribute to seed and fruit production in home gardens and orchards and to the natural reproduction of trees and shrubs.

#### *Home Gardens and Orchards*

Based on two gardening surveys conducted by the Gallup Organization (1979 and 1984), some 35 million of the 84.5 million households in the United States maintained vegetable gardens in 1983. Six vegetables were grown in more than half of the home gardens. Tomatoes, which do not require insect pollination, were popular, followed by onions, green beans, cucumbers, peppers, and lettuce. Of these crops, cucumbers rely heavily on honeybee pollination, green peppers rely somewhat, and onion seed production depends on honeybees. In all, 23 vegetables were commonly reported, 15 of which are dependent upon or benefited by insect pollination, either for direct production or for the seed from which they are grown.

[4]Other methods have been reported which overstate the value of honeybee pollination by slighting the contributions of other inputs. Levin (1983) estimated the worth of bees as the total value of the crops that they pollinate. Robinson, Nowogrodzki, and Morse (1989) estimated the value of honey bees by calculating reductions in total output without bees and valuing these reductions at current market prices. Estimates from these methods inflate the value of honeybee pollination by understating, or even ignoring, the contributions of other inputs such as water, fertilizer, pesticides, labor, and machinery. If applied to all inputs, these methods lead to the conclusion that the sum of input values exceeds total value. Although the total value of crops pollinated by bees and estimates of reductions in output without bees illustrate that honeybees are vital to agriculture, as are water, fertilizer, labor, management, and other inputs, they do not provide an appropriate basis for valuing honeybee pollination.

Twenty percent of the households surveyed were fruit tree growers, with apples being the most popular crop. About 12 percent of the households grew berries. All of the many fruits listed, with the exception of grapes and citrus, benefit strongly from or require insect pollination.

#### *Natural Ecosystems*

Honeybees perform a role in the food chain of wildlife since the productivity of natural ecosystems relies on pollination relationships that ensure the continued reproduction of nearly all plant species. The value of this service is without doubt substantial.

Barclay and Moffett (1984) compared the listings of Martin, Zim, and Nelson (1951) and Pellett (1976) and determined that 65 percent of the plants nationwide that are most important as wildlife food sources are also visited by honeybees for nectar and pollen. They also calculated that 60 percent of the cultivated plants valuable to wildlife are also valuable to honeybees, and that 85 percent of wild, woody plant species provide food for honeybees.

Barclay and Moffett (1984) also noted that many furbearers such as raccoons, coyotes, and foxes are directly dependent on various fruits like plums, apples, and prickly pears, which are pollinated by honeybees. Turkeys depend on acorns and hickory nuts, bears on acorns and various fruits, and wood ducks on several types of mast. Raccoons and bears relish honey, while kingbirds, skunks, shrews, and deer mice eat honeybees. Bee-pollinated plants provide many types of birds with cover and protection during brooding and wintering.

The crucial role of sweetclovers and other bee-pollinated soil-enriching legumes in combatting desertification was emphasized by Bales (1985). He noted the benefit of these plants to soil fertility, aquifer recharge, and watershed hydrology. Murphy, Jones, Clawson, and Street (1973) found that the presence of clovers in nonirrigated pastures quadrupled their productivity. Bales (1985) also stressed the role of honeybees in ensuring genetic diversity of plants through cross-pollination, enabling plant populations to evolve as changes occur in their ecosystem.

Before the value of honeybees to natural ecosystems can be fully assessed, much more information is needed regarding the extent to which wild plants in all kinds of natural ecosystems depend specifically on honeybees for pollination, and to what extent populations of feral colonies rely on "domestic" colonies for replenishment. Closely related is the need to assess

the effects on honeybees and pollination of large-scale chemical spray programs in forest and range ecosystems.

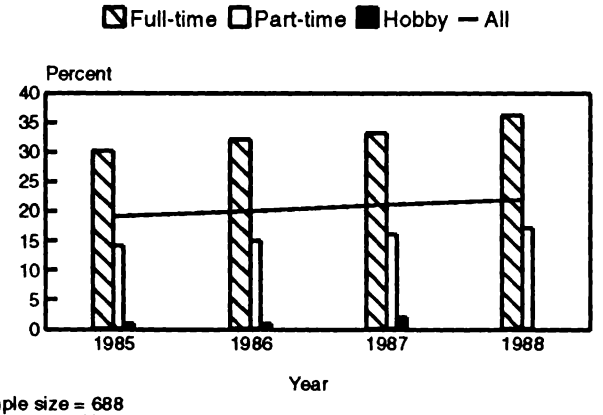
### Characteristics of Beekeepers Receiving Pollination Fees

Only about 22 percent of the 688 surveyed beekeepers reporting provided pollination services for a fee at least once between 1985 and 1988 (fig. 30). Nearly 36 percent of the full-time beekeepers received pollination fees in 1988 compared with only 17 percent of the part-time and 2 percent of the hobby beekeepers. The number of beekeepers receiving pollination income increased steadily during 1985-88, from 19 percent to 22 percent.

#### *Transportation*

The beekeepers who provided pollination services for a fee relocated their honeybees an average of three times each season and traveled an average of 12,590 miles (table 41). Full-time beekeepers provided polli-

Figure 30
**Beekeepers receiving pollination income, by firm type, 1985-88**




Sample size = 688
Source: 1988 Honey Industry Survey.

**Table 41—Bee colonies used for paid pollination services, by firm type, 1988**

| Item | Unit | Firm type | | | Total |
|---|---|---|---|---|---|
| | | Full-time | Part-time | Hobby | |
| Total distance hauled | | | | | |
| Mean | Miles | 18,487 | 1,165 | NA | 12,590 |
| Median | Miles | 7,350 | 455 | NA | 2,350 |
| Range-minimum | Miles | 10 | 20 | NA | 10 |
| Range-maximun | Miles | 150,000 | 5,000 | NA | 150,000 |
| Pollination receipts | | | | | |
| Mean | Dollars | 42,730 | 2,744 | NA | 29,118 |
| Median | Dollars | 20,127 | 1,809 | NA | 7,470 |
| Range-minimum | Dollars | 250 | 117 | NA | 117 |
| Range-maximun | Dollars | 298,866 | 17,182 | NA | 298,866 |
| Total colonies | | | | | |
| Mean | Number | 1,307 | 115 | NA | 902 |
| Median | Number | 580 | 74 | NA | 300 |
| Range-minimum | Number | 22 | 12 | NA | 12 |
| Range-maximun | Number | 6,000 | 581 | NA | 6,000 |
| Times relocated | | | | | |
| Mean | Number | 4 | 2 | NA | 3 |
| Median | Number | 2 | 2 | NA | 2 |
| Range-minimum | Number | 1 | 1 | NA | 1 |
| Range-maximun | Number | 75 | 8 | NA | 75 |
| Distance per colony | | | | | |
| Mean | Miles | 14 | 10 | NA | 14 |
| Median | Miles | 8 | 7 | NA | 8 |
| Range-minimum | Miles | 0 | 0 | NA | 0 |
| Range-maximun | Miles | 200 | 51 | NA | 200 |
| Receipts per colony | | | | | |
| Mean | Dollars | 32.68 | 23.81 | NA | 32.29 |
| Median | Dollars | 26.06 | 21.91 | NA | 25.00 |
| Range-minimum | Dollars | 6.94 | 2.99 | NA | 2.99 |
| Range-maximun | Dollars | 92.29 | 53.71 | NA | 92.29 |
| Receipts per mile | | | | | |
| Mean | Dollars | 2.31 | 2.36 | NA | 2.31 |
| Median | Dollars | 3.57 | 2.92 | NA | 3.27 |
| Range-minimum | Dollars | .08 | .25 | NA | .08 |
| Range-maximun | Dollars | 109.79 | 53.73 | NA | 109.79 |

Sample size = 94.
NA = Not reported due to disclosure.

Source: 1988 Honey Industry Survey.

nation services over a much wider geographic area than part-time beekeepers, averaging an annual total hauling distance of 18,487 miles compared with 1,165 miles for part-time beekeepers. Full-time beekeepers moved an average of 1,307 colonies compared with only 115 colonies for part-time beekeepers.

### *Pollination Receipts*

Due to the significantly larger number of colonies managed by full-time beekeepers, pollination income averaged $42,730 for full-time beekeepers receiving pollination fees, compared with $2,744 for part-time beekeepers. Pollination receipts per colony and per mile driven averaged $32.68 and $2.31 per colony, respectively, for full-time beekeepers, and $23.81 and $2.36 for part-timers.

### *Paid Pollination Services Provided*

The crop pollination services provided by the 60 full-time and 30 part-time migratory beekeepers who reported their pollination activities are shown in table 42. More of the surveyed beekeepers reported providing pollination services to almonds than any other crop. Thirty-five of the full-time and nine of the part-time beekeepers reported income from pollinating almonds in California. The rental rate per colony averaged $26.80 for the full-time and $25.77 for the part-time beekeepers.

Due to temperature requirements, almond production is limited primarily to the Sacramento and San Joaquin Valleys of California. Almonds blossom from late January to late March when the days are short and cool and other pollinators are absent. Thus, honeybees are the only pollinating insect of importance on almonds. Unsettled weather and temperatures during this time of year often restrict bee activity to 1-3 hours at midday.

A profitable almond crop depends upon cross-pollination. Almond growers want to get the most pollination possible, which leads to smaller kernels that are in greatest demand. Since there are not sufficient mobile honeybee colonies in California or in nearby adjoining States to satisfactorily pollinate California's almond crop, orchardists must pay fairly high rental rates to beekeepers to obtain sufficient numbers of colonies. Around 2.3 to 2.5 colonies are used per acre for about a month to pollinate almond trees. Although the honey harvested from almonds is of poor quality, migratory beekeepers like the crop because the nectar and pollen stimulate brood-rearing, which strengthens the colonies early in the year for the remainder of the pollination season.

Apples were the second most often pollinated crop for a rental fee. The beekeepers reported pollinating apples in 16 States. Other crops pollinated for a fee included alfalfa, cherries, cucumbers, melons, blueberries, onions, and plums.

## Pollinator Demographics

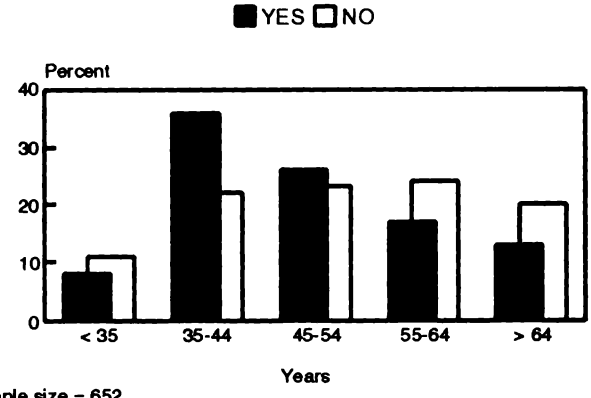
### *Age*

Beekeepers who received pollination income were younger than those reporting no colony rentals (fig. 31). Only 30 percent of the beekeepers who rented their colonies for pollination were 55 years or older in 1988, compared with 44 percent of the beekeepers with no pollination income. Sixty-two percent of the beekeepers with pollination income were 35-54 years of age.

### *Education*

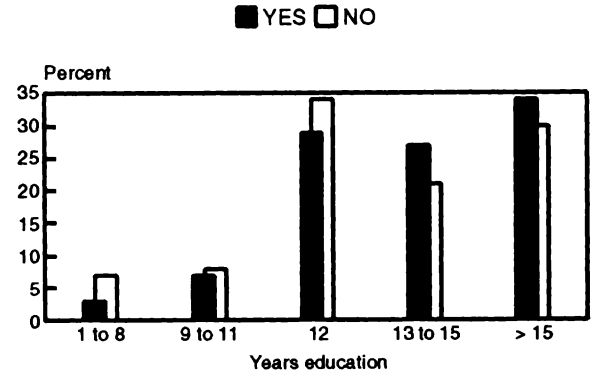
Beekeepers who provided pollination services for a fee had slightly more education than beekeepers having no pollination income (fig. 32). Over 60 percent of the

Figure 31
**Beekeepers receiving pollination income, by age class, 1988**




Sample size = 652
Source: 1988 Honey Industry Survey.

Figure 32
**Beekeepers receiving pollination income, by years education, 1988**




Sample size = 655
Source: 1988 Honey Industry Survey.

**Table 42--Crop pollination services provided for a fee, 1985-88**

| Crop | Firm type | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Full-time beekeepers | | | | | Part-time beekeepers | | | | |
| | State where service provided | Average colonies per acre | Average fee per colony | Average length of service | Beekeepers servicing crop | State where service provided | Average colonies per acre | Average fee per colony | Average length of service | Beekeepers servicing crop |
| | | *Number* | *Dollars* | *Days* | *Number* | | *Number* | *Dollars* | *Days* | *Number* |
| Alfalfa | CA | 3.1 | 17.75 | 52 | 6 | CA | NA | 18.00 | 60 | 1 |
| | ID | 3.0 | 10.00 | 30 | 1 | | | | | |
| | MT | NA | NA | 45 | 1 | | | | | |
| | UT | 1.0 | 0.00 | 45 | 1 | | | | | |
| Almonds | CA | 2.3 | 26.80 | 31 | 35 | CA | 2.5 | 25.77 | 36 | 9 |
| Apples | AL | 1.0 | 15.00 | 14 | 1 | CA | NA | 30.00 | 21 | 1 |
| | CA | 2.4 | 12.60 | 22 | 5 | IA | 1.0 | 16.00 | 10 | 1 |
| | IL | NA | 20.00 | 10 | 1 | IL | 2.0 | 15.00 | 7 | 1 |
| | ME | NA | 30.00 | 30 | 1 | MA | 0.5 | 35.00 | 10 | 1 |
| | MI | 0.5 | 18.50 | 13 | 3 | MI | 1.3 | 19.17 | 9 | 3 |
| | MN | 1.0 | 30.00 | 12 | 1 | NE | 0.5 | 15.00 | 15 | 1 |
| | OR | 1.0 | 21.00 | 30 | 1 | NY | 0.9 | 23.50 | 12 | 2 |
| | UT | NA | 9.00 | 30 | 1 | OR | 2.5 | 15.00 | 23 | 2 |
| | VT | NA | 20.00 | 10 | 1 | PA | 1.0 | 20.00 | 12 | 3 |
| | WA | 1.6 | 21.33 | 20 | 6 | UT | 2.0 | 8.00 | 30 | 1 |
| | WI | NA | 20.00 | 12 | 1 | VT | 0.4 | 32.50 | 9 | 2 |
| | | | | | | WA | 1.8 | 22.50 | 33 | 2 |
| Apricots | WA | 1.0 | 25.00 | 10 | 1 | | | | | |
| Avocado | CA | 2.5 | 2.50 | 38 | 2 | | | | | |
| Blueberries | ME | 1.5 | 30.00 | 26 | 2 | ME | 0.3 | 26.00 | 30 | 1 |
| | MI | 1.0 | 19.17 | 22 | 3 | MI | NA | 15.00 | 21 | 1 |
| | NC | 1.0 | 15.00 | 28 | 1 | OR | 2.8 | 15.33 | 29 | 3 |
| | | | | | | PA | 1.0 | 20.00 | 20 | 1 |
| Cabbage | CA | 5.0 | 10.00 | 30 | 1 | | | | | |
| Cantalope | AZ | 1.0 | 15.00 | 11 | 2 | MI | 1.0 | 22.50 | 35 | 1 |
| | CA | 1.0 | 11.00 | 26 | 2 | | | | | |
| | TX | 1.0 | 20.00 | 40 | 1 | | | | | |
| Carrots | ID | 5.5 | 16.50 | 38 | 2 | | | | | |
| Cherries | CA | 1.7 | 15.00 | 21 | 3 | OR | 2.0 | 14.00 | 18 | 4 |
| | MI | 0.5 | 22.50 | 10 | 1 | UT | 2.0 | 8.00 | 30 | 1 |
| | OR | 1.0 | 21.00 | 30 | 1 | WA | 1.5 | 25.00 | 45 | 1 |
| | UT | NA | 9.00 | 30 | 1 | | | | | |
| | WA | 2.5 | 25.00 | 15 | 2 | | | | | |
| Citrus | CA | 3.0 | 0.00 | 30 | 1 | | | | | |
| Clover | ID | 3.0 | 18.00 | 30 | 1 | OR | 1.3 | 11.33 | 27 | 3 |
| Cotton | AZ | 1.0 | 15.00 | 13 | 1 | | | | | |
| | CA | 3.0 | 0.00 | 60 | 1 | | | | | |
| Cranberries | WI | 1.0 | 30.00 | 25 | 1 | | | | | |
| Cucumbers | CA | 0.3 | 35.00 | 12 | 1 | OR | 2.0 | 15.00 | 75 | 1 |
| | GA | 1.0 | 10.00 | 30 | 1 | MI | 1.0 | 22.50 | 65 | 1 |
| | MI | 0.5 | 21.50 | 25 | 2 | | | | | |
| | TX | 2.0 | 15.00 | 15 | 1 | | | | | |
| Fruit | MI | 1.0 | 25.00 | 7 | 1 | MI | 1.0 | 22.67 | 26 | 4 |
| Kiwi | CA | 3.0 | 20.00 | 10 | 1 | | | | | |
| Melons | CA | 1.3 | 14.17 | 31 | 6 | | | | | |
| | GA | 0.5 | 10.00 | 30 | 1 | | | | | |
| Onions | CA | 3.0 | 14.50 | 30 | 2 | | | | | |
| | ID | 5.5 | 16.50 | 38 | 2 | | | | | |
| | WA | 3.0 | 20.00 | 30 | 1 | | | | | |
| Pears | WA | 2.3 | 25.00 | 18 | 2 | NY | 1.0 | 23.00 | 8 | 1 |
| | | | | | | OR | 1.5 | 10.00 | 10 | 1 |
| | | | | | | PA | NA | 20.00 | 21 | 1 |
| Pickles | MI | 1.0 | 26.67 | 45 | 3 | OH | 1.0 | 25.00 | 40 | 1 |
| | OH | 1.0 | 30.00 | 53 | 2 | | | | | |
| Plums | AL | 1.0 | 15.00 | 14 | 1 | | | | | |
| | CA | 1.7 | 28.67 | 19 | 3 | | | | | |
| | OR | 1.0 | 21.00 | 30 | 1 | | | | | |
| Prunes | CA | 1.8 | 2.83 | 19 | 3 | | | | | |
| Raspberries | | | | | | OR | 1.0 | 15.00 | 36 | 2 |
| Squash | CA | 1.5 | 12.50 | 57 | 2 | OR | 1.0 | 16.00 | 30 | 1 |
| | FL | 1.0 | 20.00 | 52 | 1 | | | | | |
| | MI | 1.0 | 25.00 | 7 | 1 | | | | | |
| Vegetable seed | CA | 2.5 | 15.00 | 35 | 2 | | | | | |

Sample size = 90 (Full-time, 60; part-time, 30).
NA indicates information not reported.

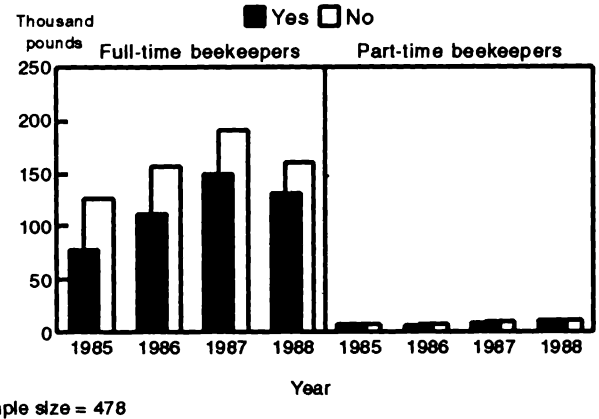
Source: 1988 Honey Industry Survey.

beekeepers with pollination income had some college education, compared with half of the beekeepers with no rental income.

### *Honey Production*

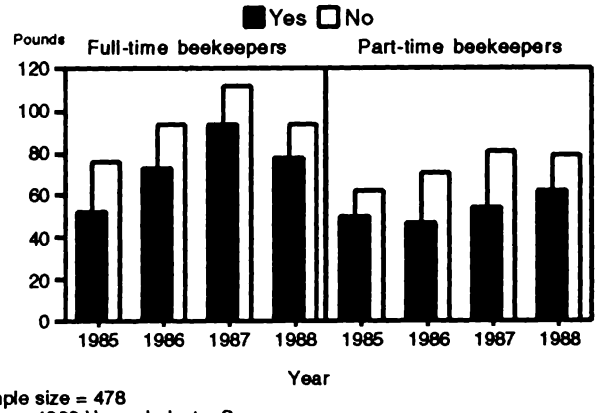
The beekeepers who reported receiving pollination income were smaller honey producers than those who received no pollination fees (fig. 33). A major reason for the lower production of beekeepers with pollination income is the lower honey yields they receive per colony. The average yield of honey per colony used for paid pollination was about 20 pounds less than the yield received from colonies that were not rented (fig. 34).

Figure 33
**Beekeepers receiving pollination income, by average honey production per firm, 1985-88**




Sample size = 478
Source: 1988 Honey Industry Survey.

Figure 34
**Beekeepers receiving pollination income, by average honey yield per colony, 1985-88**




Sample size = 478
Source: 1988 Honey Industry Survey.

Several factors likely contribute to the lower honey yields of colonies used for paid pollination. First, colonies are often placed in heavy concentrations in the orchards or fields being pollinated for a fee. This reduces the nectar and pollen available per colony. Second, many crops that are pollinated for a fee are poor sources of nectar and/or pollen. The nectar yields are so poor for some crops that the honeybees actually consume honey stored in the colony to survive. Third, colonies that are used for paid pollination may be more exposed to pesticides, which can reduce colony strength and the capacity to produce honey. Fourth, migratory beekeepers travel many miles with their colonies, which reduces the number of days that the colonies have to produce honey.

### *Firm Size*

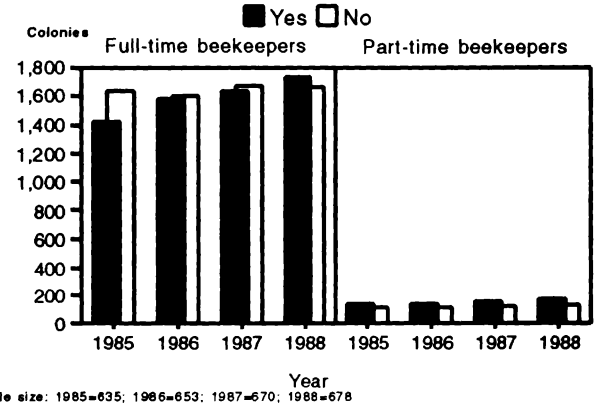
The average firm size of full- and part-time beekeepers reporting pollination income increased during 1985-88, from 1,426 to 1,732 colonies for full-time beekeepers and 135 to 177 colonies for part-time beekeepers, (fig. 35). Also, the number of beekeepers reporting whether or not they had pollination income increased from 635 in 1985 to 678 in 1988. The change in firm size for full-time beekeepers with no pollination income showed no definite trend during 1985-88. The average size of part-time beekeepers with no pollination income, however, increased from 114 to 133 colonies.

## Pollinator Financial Characteristics

### *Total Assets*

A larger percentage of beekeepers who provided paid pollination services were in the higher asset classes

Figure 35
**Firm size of beekeepers receiving pollination income, 1985-88**



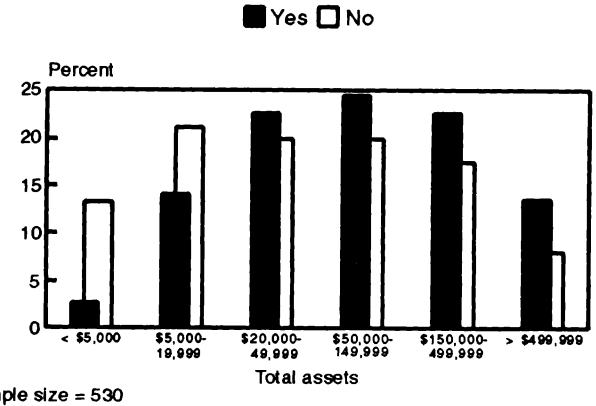

Sample size: 1985=635; 1986=653; 1987=670; 1988=678
Source: 1988 Honey Industry Survey.

compared with the beekeepers who received no income from colony rentals (fig. 36). Over 80 percent of beekeepers with pollination income had $20,000 or more of assets in 1988, compared with 66 percent of beekeepers having no colony rentals. Migratory beekeepers' investment in trucks and equipment for hauling and moving honeybee colonies likely contributes to their larger total assets.

### *Total Debts*

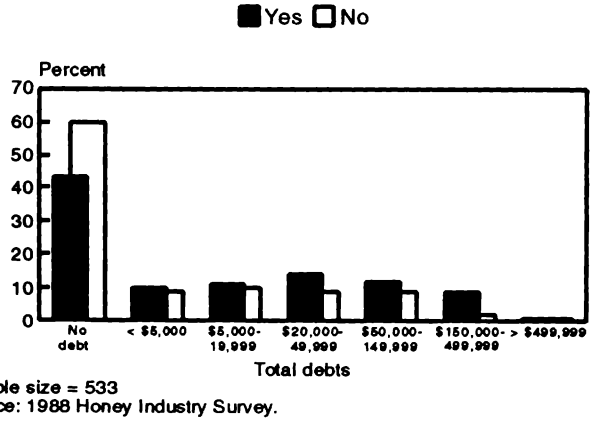
Beekeepers who received colony rental income had higher levels of total debts than beekeepers who received no rental fees. Thirty-six percent of the beekeepers with pollination income had total debts of $20,000 or more in 1988, compared with 21 percent of beekeepers with no colony rentals (fig. 37). Forty-three percent of beekeepers with pollination income reported no debts in 1988, compared with 60 percent of beekeepers with no income from paid pollination services.

Figure 36
**Beekeepers receiving pollination income, by total assets, 1988**




Sample size = 530
Source: 1988 Honey Industry Survey.

Figure 37
**Beekeepers receiving pollination income, by total debts, 1988**




Sample size = 533
Source: 1988 Honey Industry Survey.

### *Family Annual Gross Income*

Beekeepers with pollination income had higher gross family incomes in 1988 than beekeepers with no rental income. Forty-five percent of the beekeepers who rented honeybee colonies for pollination had family incomes of $40,000 or more, compared with nearly 40 percent of beekeepers with no income from colony rentals (fig. 38).

### *Gross Income*

Beekeepers who received pollination fees also had higher incomes from their beekeeping operations in 1988 than beekeepers who received no pollination fees. Twenty-five percent of beekeepers receiving rental fees had beekeeping gross incomes of $100,000 or more, and 46 percent had gross incomes of $40,000 or more (fig. 39). Conversely, 45 percent of beekeepers reporting no pollination income had gross incomes of less than $10,000.

### *Gross Receipts*

Average gross receipts were higher for the beekeepers with pollination income than for beekeepers with no pollination income (table 43). Gross receipts for beekeepers with pollination income averaged $70.78 per colony and 95 cents per pound of honey produced, compared with $59.90 per colony and 68 cents per pound for the beekeepers with no pollination income. Average gross receipts per colony and per pound of honey produced were about the same for the full- and part-time beekeepers who received pollination income. Receipts were also about the same for the full- and part-time beekeepers that did not receive pollination income.

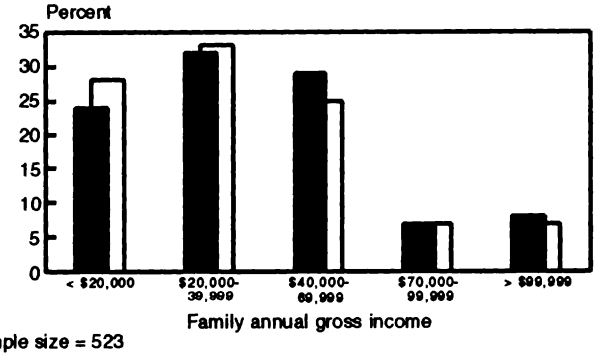
Receipts specifically attributed to pollination averaged $19.28 per colony for full-time beekeepers and $14.83 for part-time beekeepers. Pollination receipts per pound of honey produced, however, were almost identical for the full- and part-time beekeepers (26 and 23 cents) because the average honey yield per colony was higher for full-time beekeepers.

### *Gross Expenses*

Full- and part-time beekeepers who provided paid pollination services had higher gross operating expenses per colony and per pound of honey in 1988 than bee-

Figure 38

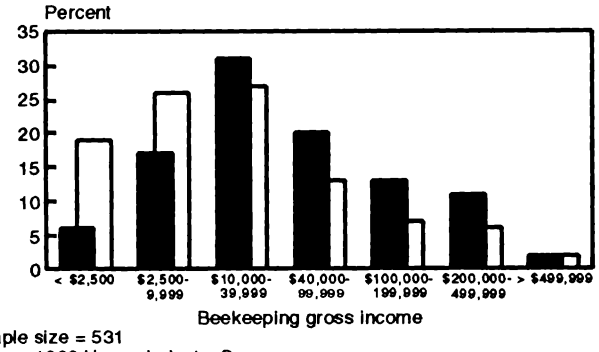
## Beekeepers receiving pollination income, by family income, 1988




Sample size = 523
Source: 1988 Honey Industry Survey.

Figure 39

## Beekeepers receiving pollination income, by beekeeping gross income, 1988




Sample size = 531
Source: 1988 Honey Industry Survey.

**Table 43--Average gross receipts from beekeeping products, services, and programs, by firms that did and did not receive pollination income, 1988**

| Pollination income, firm type, and unit | Products, services, and programs | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|
| | Honey | Pollination services | Beeswax | Package bees | Queens and nucleus colonies | Government payments | Other | |
| | *Dollars* | | | | | | | |
| **Yes** | | | | | | | | |
| Full-time | | | | | | | | |
| Per colony | 33.86 | 19.28 | 1.45 | 0.72 | 0.59 | 10.46 | 4.50 | 70.86 |
| Per pound | 0.45 | 0.26 | 0.02 | 0.01 | 0.01 | 0.14 | 0.06 | 0.95 |
| Part-time | | | | | | | | |
| Per colony | 39.20 | 14.83 | 0.55 | 0.00 | 0.15 | 12.08 | 2.40 | 69.21 |
| Per pound | 0.61 | 0.23 | 0.01 | 0.00 | 0.00 | 0.19 | 0.04 | 1.08 |
| Total | | | | | | | | |
| Per colony | 34.12 | 19.07 | 1.40 | 0.68 | 0.57 | 10.54 | 4.40 | 70.78 |
| Per pound | 0.46 | 0.25 | 0.02 | 0.01 | 0.01 | 0.14 | 0.06 | 0.95 |
| **No** | | | | | | | | |
| Full-time | | | | | | | | |
| Per colony | 33.26 | 0.00 | 1.06 | 1.09 | 1.89 | 22.21 | 0.91 | 60.42 |
| Per pound | 0.38 | 0.00 | 0.01 | 0.01 | 0.02 | 0.25 | 0.01 | 0.68 |
| Part-time | | | | | | | | |
| Per colony | 35.74 | 0.00 | 0.67 | 0.08 | 0.52 | 17.18 | 1.19 | 55.38 |
| Per pound | 0.45 | 0.00 | 0.01 | 0.00 | 0.01 | 0.22 | 0.01 | 0.70 |
| Hobby | | | | | | | | |
| Per colony | 21.34 | 0.00 | 0.53 | 0.00 | 0.00 | 15.91 | 0.11 | 37.89 |
| Per pound | 0.28 | 0.00 | 0.01 | 0.00 | 0.00 | 0.21 | 0.00 | 0.50 |
| Total | | | | | | | | |
| Per colony | 33.44 | 0.00 | 1.02 | 1.00 | 1.76 | 21.75 | 0.93 | 59.90 |
| Per pound | 0.38 | 0.00 | 0.01 | 0.01 | 0.02 | 0.25 | 0.01 | 0.68 |

Sample size:
Firms receiving pollination income = 123 (Full-time = 81, Part-time = 42, Hobby = 0).
Firms not receiving pollination income = 369 (Full-time = 143, Part-time = 168, Hobby = 58).

Source: 1988 Honey Industry Survey.

keepers with no pollination income (tables 44 and 45). The gross expenses of beekeepers with pollination income averaged $55.03 per colony and 74 cents per pound in 1988 compared with $50.91 and 58 cents for beekeepers with no pollination income. Beekeepers who provided pollination services for a fee reported higher costs for insurance, taxes, mortgage on buildings, gas and oil, and other (which includes lodging while moving honeybee colonies) than beekeepers who did not provide paid pollination services.

Gross expenses incurred per colony by full- and part-time beekeepers who provided pollination services for a fee were almost identical, at $55.08 for full-time and $54 for part-time beekeepers. Due to their lower honey yields per colony, part-time beekeepers had higher cost (85 cents) per pound of honey produced than full-time beekeepers (73 cents).

### *Net Income*

The average total net income of beekeepers that received pollination fees was higher than for beekeepers who did not receive pollination fees. Half the beekeepers with no pollination income had a total net income of less than $2,500 in 1988, while 65 percent of the beekeepers who received pollination fees had total net incomes of $2,500 or more (fig. 40). Four percent of each of the two groups of beekeepers had total net incomes of $50,000 or more.

Net income per hive and per pound of honey produced was highest for beekeepers with pollination income, averaging $15.75 per colony and 21 cents a pound, compared with $8.99 per colony and 10 cents a pound for beekeepers with no pollination income

**Table 44—Average gross expenses of beekeeping operations with pollination income, by firm type, 1988**

| Cost item | Firm type | | | | | |
|---|---|---|---|---|---|---|
| | Full-time | | Part-time | | Total | |
| | Per colony | Per pound | Per colony | Per pound | Per colony | Per pound |
| | *Dollars* | | | | | |
| Labor | 15.94 | 0.21 | 5.37 | 0.08 | 15.42 | 0.21 |
| Hired labor | 10.81 | 0.14 | 3.40 | 0.05 | 10.45 | 0.14 |
| Benefits | 0.82 | 0.01 | 0.08 | 0.00 | 0.78 | 0.01 |
| Other | 4.31 | 0.06 | 1.89 | 0.03 | 4.19 | 0.06 |
| Bees | 6.33 | 0.08 | 3.52 | 0.06 | 6.20 | 0.08 |
| Bee food | 3.98 | 0.05 | 1.62 | 0.03 | 3.87 | 0.05 |
| Queens and nucleus colonies | 1.27 | 0.02 | 1.62 | 0.03 | 1.29 | 0.02 |
| Package bees | 1.08 | 0.01 | 0.28 | 0.00 | 1.04 | 0.01 |
| Supplies | 6.75 | 0.09 | 13.56 | 0.22 | 7.09 | 0.09 |
| Equipment | 7.77 | 0.11 | 8.97 | 0.14 | 7.83 | 0.11 |
| Repairs/maint. | 3.67 | 0.05 | 4.51 | 0.07 | 3.71 | 0.05 |
| Gas and oil | 4.10 | 0.06 | 4.46 | 0.07 | 4.12 | 0.06 |
| Buildings | 4.59 | 0.06 | 13.27 | 0.21 | 5.00 | 0.07 |
| Repairs/maint. | 1.44 | 0.02 | 1.42 | 0.02 | 1.44 | 0.02 |
| Mortgage | 3.15 | 0.04 | 11.85 | 0.19 | 3.56 | 0.05 |
| Overhead | 10.17 | 0.14 | 5.95 | 0.10 | 9.97 | 0.14 |
| Utilities | 1.34 | 0.02 | 1.55 | 0.02 | 1.35 | 0.02 |
| Insurance | 2.70 | 0.04 | 1.63 | 0.03 | 2.65 | 0.04 |
| Taxes | 2.49 | 0.03 | 0.94 | 0.02 | 2.42 | 0.03 |
| Rent | 1.52 | 0.02 | 0.58 | 0.01 | 1.47 | 0.02 |
| Interest | 1.60 | 0.02 | 0.75 | 0.01 | 1.56 | 0.02 |
| Other | 0.52 | 0.01 | 0.50 | 0.01 | 0.52 | 0.01 |
| Marketing | 0.43 | 0.00 | 0.74 | 0.00 | 0.44 | 0.00 |
| Advertising | 0.20 | 0.00 | 0.20 | 0.00 | 0.20 | 0.00 |
| Subscriptions | 0.05 | 0.00 | 0.22 | 0.00 | 0.06 | 0.00 |
| Promotion | 0.13 | 0.00 | 0.25 | 0.00 | 0.13 | 0.00 |
| Fees | 0.05 | 0.00 | 0.07 | 0.00 | 0.05 | 0.00 |
| Other | 3.10 | 0.04 | 2.62 | 0.04 | 3.08 | 0.04 |
| Total | 55.08 | 0.73 | 54.00 | 0.85 | 55.03 | 0.74 |

Sample size = 123 (Full-time, 81; part-time, 42; hobby, 0).

Source: 1988 Honey Industry Survey.

**Table 45—Average gross expenses of beekeeping operations without pollination income, by firm type, 1988**

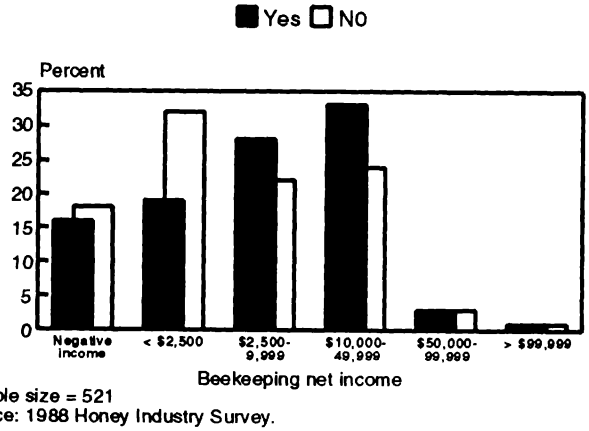
| Cost item | Firm type: Full-time | | Part-time | | Hobby | | Total | |
|---|---|---|---|---|---|---|---|---|
| | Per colony | Per pound | Per colony | Per pound | Per colony | Per pound | Per colony | Per pound |
| | *Dollars* | | | | | | | |
| Labor | 17.01 | 0.19 | 3.16 | 0.04 | 0.57 | 0.01 | 15.75 | 0.18 |
| Hired labor | 12.30 | 0.14 | 2.47 | 0.03 | 0.40 | 0.01 | 11.41 | 0.13 |
| Benefits | 1.13 | 0.01 | 0.20 | 0.00 | 0.00 | 0.00 | 1.04 | 0.01 |
| Other | 3.58 | 0.04 | 0.49 | 0.01 | 0.17 | 0.00 | 3.30 | 0.04 |
| Bees | 5.98 | 0.06 | 5.28 | 0.07 | 5.39 | 0.07 | 5.91 | 0.07 |
| Bee food | 4.37 | 0.05 | 2.32 | 0.03 | 1.21 | 0.02 | 4.18 | 0.05 |
| Queens and nucleus colonies | 1.30 | 0.01 | 1.65 | 0.02 | 3.01 | 0.04 | 1.33 | 0.01 |
| Package bees | 0.31 | 0.00 | 1.31 | 0.02 | 1.17 | 0.01 | 0.40 | 0.01 |
| Supplies | 7.88 | 0.08 | 9.08 | 0.12 | 13.39 | 0.18 | 8.00 | 0.09 |
| Equipment | 7.22 | 0.08 | 6.90 | 0.09 | 7.75 | 0.11 | 7.19 | 0.08 |
| Repairs/maint. | 3.73 | 0.04 | 3.15 | 0.04 | 2.71 | 0.04 | 3.67 | 0.04 |
| Gas and oil | 3.49 | 0.04 | 3.75 | 0.05 | 5.04 | 0.07 | 3.52 | 0.04 |
| Buildings | 3.00 | 0.03 | 5.66 | 0.07 | 1.73 | 0.02 | 3.23 | 0.03 |
| Repairs/maint. | 1.06 | 0.01 | 2.66 | 0.03 | 0.86 | 0.01 | 1.20 | 0.01 |
| Mortgage | 1.94 | 0.02 | 3.00 | 0.04 | 0.87 | 0.01 | 2.03 | 0.02 |
| Overhead | 8.14 | 0.11 | 7.38 | 0.09 | 2.66 | 0.03 | 8.05 | 0.10 |
| Utilities | 1.39 | 0.02 | 2.03 | 0.03 | 1.12 | 0.01 | 1.44 | 0.02 |
| Insurance | 1.83 | 0.02 | 1.18 | 0.01 | 0.05 | 0.00 | 1.77 | 0.02 |
| Taxes | 1.30 | 0.02 | 1.78 | 0.02 | 0.72 | 0.01 | 1.34 | 0.01 |
| Rent | 1.44 | 0.02 | 1.54 | 0.02 | 0.75 | 0.01 | 1.44 | 0.02 |
| Interest | 1.76 | 0.02 | 0.55 | 0.01 | 0.00 | 0.00 | 1.65 | 0.02 |
| Other | 0.42 | 0.01 | 0.30 | 0.00 | 0.02 | 0.00 | 0.41 | 0.01 |
| Marketing | 0.61 | 0.00 | 0.46 | 0.00 | 0.49 | 0.00 | 0.61 | 0.00 |
| Advertising | 0.36 | 0.00 | 0.16 | 0.00 | 0.06 | 0.00 | 0.34 | 0.00 |
| Subscriptions | 0.06 | 0.00 | 0.15 | 0.00 | 0.42 | 0.00 | 0.07 | 0.00 |
| Promotion | 0.13 | 0.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.13 | 0.00 |
| Fees | 0.06 | 0.00 | 0.10 | 0.00 | 0.01 | 0.00 | 0.07 | 0.00 |
| Other | 2.25 | 0.03 | 1.28 | 0.02 | 1.42 | 0.02 | 2.17 | 0.03 |
| Total | 52.09 | 0.58 | 39.20 | 0.50 | 33.40 | 0.44 | 50.91 | 0.58 |

Sample size = 369 (Full-time, 143; part-time, 168; hobby, 58).

Source: 1988 Honey Industry Survey.

Figure 40

**Beekeepers receiving pollination income, by beekeeping net income, 1988**




Sample size = 521
Source: 1988 Honey Industry Survey.

(table 46). There was no significant difference in the average net income of the full- and part-time beekeepers having pollination income.

Thirty-three percent of the beekeepers without pollination income and 21 percent of those with pollination income had a negative net income per colony and per pound of honey produced (tables 47 and 48). On a colony basis, however, 15 percent of the beekeepers with pollination income and 15 percent of those without pollination income had net incomes of $50 or more per colony. Eighty percent of the beekeepers without pollination income had net incomes of 49 cents or less per pound of honey, compared with 69 percent of the beekeepers with pollination income.

## Marketing

Honey is marketed nationwide since production and consumption occur in all States. Beekeepers have a choice of markets for their honey crop (fig. 41).

## Table 46—Average net income of beekeeping operations that did and did not receive pollination income, 1988

| Pollination income and item | Firm type: Full-time, Per colony | Full-time, Per pound | Part-time, Per colony | Part-time, Per pound | Hobby, Per colony | Hobby, Per pound | Total, Per colony | Total, Per pound |
|---|---|---|---|---|---|---|---|---|
| | *Dollars* | | | | | | | |
| **Yes** | | | | | | | | |
| Gross receipts | 70.86 | 0.95 | 69.21 | 1.08 | | | 70.78 | 0.95 |
| Gross expenses | 55.08 | 0.73 | 54.00 | 0.85 | | | 55.03 | 0.74 |
| Net income[1] | 15.78 | 0.22 | 15.21 | 0.23 | | | 15.75 | 0.21 |
| **No** | | | | | | | | |
| Gross receipts | 60.42 | 0.68 | 55.38 | 0.70 | 37.89 | 0.50 | 59.90 | 0.68 |
| Gross expenses | 52.09 | 0.58 | 39.20 | 0.50 | 33.40 | 0.44 | 50.91 | 0.58 |
| Net income[1] | 8.33 | 0.10 | 16.18 | 0.20 | 4.49 | 0.06 | 8.99 | 0.10 |

[1]Return to unpaid land, labor, capital, and management.
Sample size:
Firms receiving pollination income = 123 (Full-time, 81; part-time, 42; hobby, 0).
Firms not receiving pollination income = 369 (Full-time, 143; part-time, 168; hobby, 58).

Source: 1988 Honey Industry Survey.

## Table 47—Distribution of beekeeping firms by receipt of pollination income, by net income per colony, 1988

| Pollination income and firm type | Net income per colony (dollars): Costs exceeded Income | 0.00 to 9.99 | 10.00 to 24.99 | 25.00 to 49.99 | 50.00 to 74.99 | 75.00 to 99.99 | 100.00 to 149.99 | 150.00 or more |
|---|---|---|---|---|---|---|---|---|
| | *Percent* | | | | | | | |
| **Yes** | | | | | | | | |
| Full-time | 20 | 12 | 28 | 21 | 10 | 5 | 4 | 0 |
| Part-time | 24 | 12 | 24 | 30 | 5 | 5 | 0 | 0 |
| All | 21 | 12 | 27 | 25 | 8 | 5 | 2 | 0 |
| **No** | | | | | | | | |
| Full-time | 31 | 12 | 19 | 25 | 6 | 3 | 2 | 2 |
| Part-time | 31 | 11 | 21 | 20 | 8 | 4 | 4 | 1 |
| Hobby | 41 | 15 | 10 | 23 | 3 | 3 | 2 | 3 |
| All | 33 | 12 | 18 | 22 | 6 | 4 | 3 | 2 |

Sample size:
Firms receiving pollination income = 123 (Full-time, 81; part-time, 42; hobby,0).
Firms not receiving pollination income = 369 (Full-time, 143; part-time, 168; hobby, 580).

Source: 1988 Honey Industry Survey.

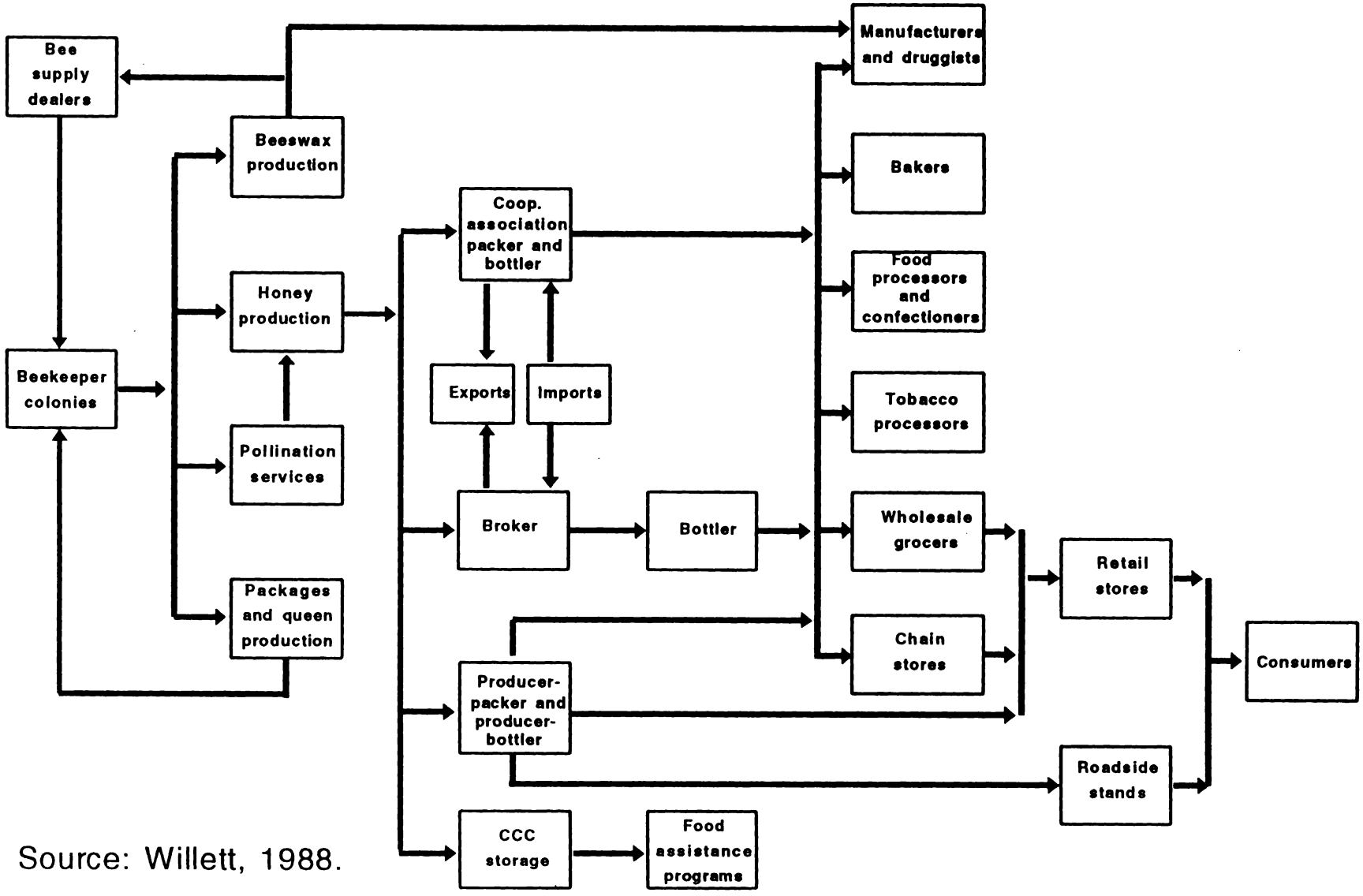
## Table 48—Distribution of beekeeping firms by receipt of pollination income, by net income per pound of honey, 1988

| Pollination income and firm type | Net income per pound (dollars): Costs exceeded Income | 0.00 to 0.09 | 0.10 to 0.24 | 0.25 to 0.49 | 0.50 to 0.74 | 0.75 to 0.99 | 1.00 to 1.24 | 1.25 or more |
|---|---|---|---|---|---|---|---|---|
| | *Percent* | | | | | | | |
| **Yes** | | | | | | | | |
| Full-time | 20 | 7 | 12 | 30 | 12 | 7 | 7 | 5 |
| Part-time | 24 | 5 | 14 | 26 | 2 | 12 | 0 | 17 |
| All | 21 | 7 | 13 | 28 | 9 | 9 | 5 | 8 |
| **No** | | | | | | | | |
| Full-time | 31 | 9 | 20 | 23 | 10 | 3 | 2 | 2 |
| Part-time | 31 | 7 | 10 | 32 | 10 | 6 | 1 | 3 |
| Hobby | 41 | 9 | 7 | 21 | 9 | 7 | 3 | 3 |
| All | 33 | 8 | 13 | 26 | 10 | 5 | 2 | 3 |

Sample size:
Firms receiving pollination income = 123 (Full-time, 81; part-time, 42; hobby,0).
Firms not receiving pollination income = 369 (Full-time, 143; part-time, 168; hobby, 58).

Source: 1988 Honey Industry Survey.

## Figure 41
# U.S. beekeeping industry




Source: Willett, 1988.

Some beekeepers sell their honey in bulk containers to cooperative marketing associations, packers, bottlers, and food manufacturers. Beekeepers may also use a broker or dealer who assumes the responsibility for contacting a bottler and distributing the honey, or they may package or bottle their own honey in retail containers and sell directly to stores, consumers, or both. Finally, the beekeeper may choose to use the honey as collateral to secure a loan from the USDA's Commodity Credit Corporation (CCC). Beekeepers may forfeit this honey to the CCC rather than repay the loan upon maturity or they may repay the loan at the buy-back rate and retain ownership to the honey.[5] Beekeepers who do not obtain a loan on their honey may obtain a deficiency payment equal to the difference between the loan rate and the buy-back rate.

Processed honey is marketed by producer-packers, cooperative marketing associations, and bottlers.

- Producer-packers are beekeepers who bottle and sell part or all of their honey crop, generally from roadside stands, farmer's markets, their homes, local stores and restaurants, or door-to-door. Some employ brokers or dealers to move the honey into retail chains.

- Cooperative marketing organizations process, pack, and distribute their members' honey under the cooperative label. Some cooperatives pool and market their honey in bulk containers. Cooperatives, along with the private dealers and brokers, may also export a small amount of honey.

- Packers (bottlers) are generally large, well-organized firms that distribute advertised brands of honey or provide private-label packing for retail chains. These firms buy honey from domestic and foreign sources and may blend the final product to keep color and flavor as uniform as possible.

The CCC donates honey from stocks acquired through the honey price support program. Most donations are made to the National School Lunch Program and the Temporary Emergency Food Assistance Program (TEFAP), operated by USDA's Food and Nutrition Service. Most TEFAP donations go to food banks distributing emergency food assistance. The Bureau of Prisons has also received some CCC honey stocks.

[5]A description of the honey price support program begins on page 54.

Industrial users primarily purchase honey in bulk from processors, but may also buy directly from producers or from dealers and brokers. The major industrial users are the baking, dairy, cereal, confectionery, pharmaceutical, and tobacco industries, the restaurant trade, and other processors of sweetened products.

### Quality Standardization

Honey is usually marketed by color grade, since color often indicates a significant difference in flavor. Lighter honeys are demanded more as table honey since they usually taste milder. The stronger-flavored dark honeys are usually used in the baking trade.

Grade standards have been established by the USDA for extracted and comb honey. Although use of the standards is not compulsory, they provide a convenient basis for inspection and sales, for establishing quality control programs, and for determining loan values of honey under the price support program.

#### *USDA Grades*

U.S. grades for extracted honey are based on three quality factors (flavor, absence of defects, and clarity) and minimum soluble solids requirements. Flavor refers to the prominence of the honey flavor and aroma and to its conformity to the flavor and aroma of the predominant floral source or blend of sources. Absence of defects refers to the degree of cleanliness and to the degree of freedom from particles of comb, propolis, or other defects that may be in suspension or deposited as sediment in the container. Clarity refers to the degree of freedom from air bubbles, pollen grains, or fine particles of any material that may be suspended in the product.

After examining the quality factors, the specific grade is determined by means of a scoring system that weights the characteristics of the factors as follows:

| Factors | Possible Points |
|---|---|
| Flavor | 50 |
| Absence of defects | 40 |
| Clarity | 10 |
| Total possible score | 100 |

USDA color standards include water white, extra white, white, extra light amber, light amber, amber, and dark amber. Although a number of devices have been developed to determine the color of honey, the most

popular devices used in the commercial trade are the Pfund grader and the USDA color comparator. With these devices, the color of a unit of honey is determined by matching it with colored wedges or colored glass sheets that represent the accepted color standards.

Four U.S. grades have been designated for extracted honey:

- **"U.S. Grade A" or "U.S. Fancy:"** contains not less than 81.4 percent soluble solids; possesses a good flavor for the predominant floral source or, when blended, a good flavor for the blend of floral sources; is free from defects; and is of such quality with respect to clarity as to score not less than 90 points.

- **"U.S. Grade B" or "U.S. Choice:"** contains not less than 81.4 percent soluble solids; possesses a reasonably good flavor for the predominant floral source or, when blended, a reasonably good flavor for the blend of floral sources; is reasonably clear; and scores not less than 80 points.

- **"U.S. Grade C" or "U.S. Standard:"** contains not less than 80 percent soluble solids and is suitable for reprocessing; possesses a fairly good flavor for the predominant floral source or, when blended, a fairly good flavor for the blend of floral sources; is fairly free from defects; and is of such quality with respect to clarity as to score not less than 70 points.

- **"U.S. Grade D" or "Substandard:"** fails to meet the requirements of "U.S. Grade C" or "U.S. Standard."

According to USDA grades, comb honey falls into five categories: comb-section, shallow-frame comb, wrapped cut-comb, chunk or bulk comb, and unclassified chunk or bulk comb. The quality factors used to ascertain the grades are appearance of cappings, presence of pollen grains, uniformity of honey, attachment of comb to section, absence of granulation, presence of honeydew, and weight. USDA grades for comb-section honey are: "U.S. Fancy," "U.S. No. 1," "U.S. No. 1 Mixed Color," "U.S. No. 2," and "Unclassified." Grades for shallow-frame comb, wrapped cut-comb, and chunks or bulk honey packed in tin or glass are: "U.S. Fancy," "U.S. No. 1," and "Unclassified." The four color grades for comb honey are: white, light amber, amber, and dark amber.

### *Grades Marketed by Beekeepers*

Full-time beekeepers marketed a larger percentage of white honey than part-time and hobby beekeepers during 1985-88 (table 49). Likewise, part-time beekeepers marketed a larger percentage of white honey than hobbyists. These results are likely due to the ability of the large commercial beekeepers to move their colonies over a wide geographic area to floral sources producing premium honey. Due to the non-beekeeping activities and smaller number of colonies, there are fewer opportunities and incentives for part-time and hobby beekeepers to relocate their colonies near better floral sources.

Some beekeepers indicate that many crops pollinated for a fee do not provide much nectar or a high grade of honey. There was generally not much difference, however, in the grades of honey marketed during 1985-88 by the beekeepers that did or did not receive pollination fees (table 50). The exception was the higher percentage of white and extra light amber honey marketed by part-time beekeepers who did not receive pollination fees.

Full-time and part-time beekeepers who used the honey program tended to market a slightly higher percentage of white honey than beekeepers who did not use the program (table 51).

## Promotion

Honey is promoted at the national level by the National Honey Board, honey industry representatives appointed by the Secretary of Agriculture to administer the Honey Research, Promotion, and Consumer Information Order. The order, approved in May 1986 in a referendum of honey producers and importers, established a program for funding of marketing research, advertising, and promotion to benefit the entire honey industry. The promotion program's goal is to help maintain and expand the domestic and foreign markets for honey and to develop new and improved markets. The Honey Board's program is funded by an assessment of one cent on each pound of honey (domestic,

**Table 49—Grades of honey marketed, by firm type, 1985-88 average**

| Grade marketed | Firm type | | | Total |
|---|---|---|---|---|
| | Full-time | Part-time | Hobby | |
| | | *Percent* | | |
| White | 56.4 | 39.8 | 23.4 | 55.4 |
| Extra light amber | 24.3 | 25.9 | 28.2 | 24.5 |
| Light amber | 14.7 | 23.5 | 22.0 | 15.2 |
| Amber | 4.4 | 10.2 | 26.1 | 4.7 |
| Other | 0.2 | 0.6 | 0.3 | 0.2 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |

Sample size = 535.

Source: 1988 Honey Industry Survey.

**Table 50—Grades of honey marketed, by beekeepers receiving pollination fees and firm type, 1985-88 average**

| Receive pollination fees and grade marketed | Firm type | | | Total |
|---|---|---|---|---|
| | Full-time | Part-time | Hobby | |
| | | *Percent* | | |
| **Yes** | | | | |
| White | 54.8 | 29.6 | NA | 53.7 |
| Extra light amber | 24.2 | 35.5 | NA | 24.8 |
| Light amber | 12.5 | 24.8 | NA | 13.0 |
| Amber | 8.2 | 9.9 | NA | 8.3 |
| Other | 0.3 | 0.2 | NA | 0.2 |
| Total | 100.0 | 100.0 | | 100.0 |
| **No** | | | | |
| White | 57.0 | 43.0 | 23.4 | 56.1 |
| Extra light amber | 24.4 | 22.8 | 28.2 | 24.3 |
| Light amber | 15.6 | 23.1 | 22 | 16.1 |
| Amber | 2.8 | 10.4 | 26.1 | 3.3 |
| Other | 0.2 | 0.7 | 0.3 | 0.2 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |

Sample size = 533.
NA = Not applicable.

Source: 1988 Honey Industry Survey.

**Table 51—Grades of honey marketed, by participants in the honey price support program and firm type, 1985-88 average**

| Program use and grade marketed | Firm type | | | Total |
|---|---|---|---|---|
| | Full-time | Part-time | Hobby | |
| | | *Percent* | | |
| **Yes** | | | | |
| White | 56.6 | 40.6 | 23.4 | 55.9 |
| Extra light amber | 24.2 | 25.9 | 24.5 | 24.3 |
| Light amber | 14.6 | 23.7 | 25.2 | 15.0 |
| Amber | 4.4 | 9.2 | 26.6 | 4.6 |
| Other | 0.2 | 0.6 | 0.3 | 0.2 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |
| **No** | | | | |
| White | 46.1 | 29.4 | 23.7 | 43.9 |
| Extra light amber | 28.2 | 25.1 | 41.0 | 28.0 |
| Light amber | 20.4 | 21.5 | 10.5 | 20.4 |
| Amber | 5.0 | 23.7 | 24.6 | 7.4 |
| Other | 0.3 | 0.3 | 0.2 | 0.3 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |

Sample size = 532.

Source: 1988 Honey Industry Survey.

imported, and exported) as it enters the channels of commerce. Producers who estimate that they will produce less than 6,000 pounds of honey during the calendar year and who do not wish to support the honey promotional program may file for an exemption from the assessment if the honey is marketed through local retail outlets, such as roadside stands, farmer's markets, and grocery stores. Refunds were initially available to those who did not wish to invest in the promotional efforts of the program. The assessment refund provisions were terminated, however, after a referendum of honey producers and importers in August 1991.

A major thrust of the National Honey Board has been to expand and develop the use of honey in manufactured products and to increase retail demand and export trade for honey. The Board creates articles, recipes, and color photos for newspapers and magazines. Magazine editors and freelance writers generate articles on honey and honey uses. The Board's Food Technology Market Development Program has successfully established new product markets and increased uses of honey by commercial manufacturers. The Board reported that 493 different honey-containing products were available to consumers in 1988 and that additional new honey-containing products were being introduced.

Numerous organizations promote specific aspects of beekeeping at either the national, regional, State, or local level. Organizations exist for honey producers, queen breeders, royal jelly producers and dealers, apiary inspectors, manufacturers of beekeeping supplies and equipment, honey packers and dealers, and apiculture researchers and scientists.

### *Beekeeping Firm Marketing Practices*

The beekeeping industry uses various outlets to market honey (table 52). The markets used by the respondents varied among producers, packers, importers, and brokers, as well as among firm types.

Full-time beekeepers marketed about 60 percent of their honey through packer/bottlers and forfeited slightly over 25 percent to the Commodity Credit Corporation (CCC) during 1985-88. Part-time beekeepers forfeited one-third of their honey crop to the CCC and sold 25 percent to independent packer/bottlers and 16 percent to retail stores. Hobby beekeepers marketed 28 percent of their honey through roadside stands and 20 percent to brokers or dealers and forfeited 18 percent to the CCC.

Retail stores and industrial users were the primary markets for about 90 percent of the packers' honey. The most important market for full-time packers was industrial uses, while retail stores were the major market for part-time packers. Part-time producer-packers marketed about one-third of their honey to industrial users, compared with less than 1 percent for the part-time nonproducer-packers.

Importers and brokers marketed over 82 percent of their honey to independent packer/bottlers. Institutional purchases accounted for another 10 percent of the importer and broker honey sales.

### *Advertising and Promotion Practices*

Forty-four percent of the beekeepers did not use any form of advertising to market their honey (table 53).

**Table 52--Markets used to dispose of honey crop, by firm type, 1985-88 average**

| Market | Firm type | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Beekeepers | | | | Packers | | | | Importers and brokers |
| | Full-time | Part-time | Hobby | Total | Full-time | Part-time | | Total | Full-time |
| | | | | | | Producer | Nonproducer | | |
| | *Percent* | | | | | | | | |
| Roadside | 1.2 | 6.3 | 28.2 | 1.5 | 0.1 | 3.5 | 7.7 | 0.2 | 0.0 |
| Retail stores | 3.4 | 16.4 | 8.9 | 4.0 | 36.7 | 44.8 | 63.4 | 37.0 | 3.0 |
| Institutions | 0.2 | 0.5 | 1.8 | 0.2 | 8.4 | 2.7 | 0.7 | 8.1 | 10.0 |
| Broker or dealer | 5.1 | 4.4 | 19.6 | 5.1 | 0.2 | 6.5 | 15.1 | 0.5 | NA |
| Packer/bottlers | | | | | | | | | |
| Independent | 35.8 | 25.0 | 10.6 | 35.3 | NA | NA | NA | NA | 82.4 |
| Cooperative | 24.2 | 7.3 | 6.4 | 23.4 | NA | NA | NA | NA | 0.0 |
| Direct export | 0.2 | 1.0 | 0.0 | 0.2 | 0.0 | 0.4 | 0.0 | 0.1 | 1.2 |
| Industrial user | 3.0 | 2.5 | 1.5 | 2.9 | 52.6 | 32.9 | 0.7 | 51.8 | 3.4 |
| CCC | 25.2 | 32.4 | 17.6 | 25.5 | NA | NA | NA | NA | NA |
| Other | 0.8 | 2.1 | 2.6 | 0.9 | 1.2 | 4.9 | 11.4 | 1.4 | 0.0 |
| Storage | 0.9 | 2.1 | 2.8 | 1.0 | 0.8 | 4.3 | 1.0 | 0.9 | 0.0 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Sample size = (beekeepers, 556; packers, 112; importers and brokers, 13).
NA = No respondents.

Source: 1988 Honey Industry Survey.

**Table 53--Advertising activities of beekeepers, by firm type, 1988**

| Firm type and product or service | Advertising activity | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Local newspaper | Circulars | Beekeeping journals | Magazines | Community bulletin boards | Direct mail | Road signs | Word of mouth | Other | Didn't advertise |
| | *Percent* | | | | | | | | | |
| Full-time | | | | | | | | | | |
| Honey | 8.4 | 3.1 | 2.4 | 2.4 | 1.4 | 6.3 | 7.0 | 38.5 | 11.2 | 51.0 |
| Honey with other products | 2.4 | 0.7 | 1.0 | 1.0 | 0.3 | 2.1 | 1.0 | 9.4 | 4.9 | 85.0 |
| Beeswax | 0.3 | | 1.0 | 0.3 | 0.3 | 0.3 | 0.3 | 14.7 | 3.5 | 81.8 |
| Pollination services | 2.4 | 1.0 | 0.7 | 1.4 | 0.3 | 1.4 | 0.3 | 21.7 | 4.2 | 73.4 |
| Package bees and queens | 0.7 | 0.3 | 2.8 | 0.3 | | 1.0 | 0.3 | 6.3 | 2.1 | 90.2 |
| Part-time | | | | | | | | | | |
| Honey | 10.0 | 3.1 | 0.3 | 0.3 | 3.4 | 2.1 | 17.2 | 50.5 | 8.6 | 39.5 |
| Honey with other products | 2.1 | 1.4 | 0.3 | | 1.0 | 1.0 | 2.4 | 11.3 | 2.4 | 86.3 |
| Beeswax | 1.0 | 0.3 | | | 0.3 | 0.3 | 1.0 | 13.7 | 1.7 | 84.5 |
| Pollination services | 1.0 | | 0.3 | 0.7 | 0.7 | 1.4 | 0.7 | 13.4 | 1.4 | 83.5 |
| Package bees and queens | 0.3 | 1.0 | 0.3 | 0.3 | 0.7 | 1.4 | 0.7 | 5.8 | 0.3 | 93.1 |
| Hobby | | | | | | | | | | |
| Honey | 7.0 | | | 1.2 | 4.7 | 1.2 | 20.9 | 55.8 | 10.5 | 36.0 |
| Honey with other products | 3.5 | 1.2 | 2.3 | 2.3 | | 1.2 | 2.3 | 3.5 | | 94.2 |
| Beeswax | | | | | | | 1.2 | 3.5 | 2.3 | 94.2 |
| Pollination services | | | | | | | 1.2 | 2.3 | | 97.7 |
| Package bees and queens | | | | | | | 1.2 | 1.2 | | 98.8 |
| Total | | | | | | | | | | |
| Honey | 8.9 | 2.7 | 1.2 | 1.4 | 2.7 | 3.8 | 13.3 | 46.0 | 10.0 | 44.0 |
| Honey with other products | 2.4 | 1.1 | 0.9 | 0.8 | 0.6 | 1.5 | 1.8 | 9.5 | 3.2 | 86.7 |
| Beeswax | 0.6 | 0.2 | 0.5 | 0.2 | 0.3 | 0.3 | 0.8 | 12.8 | 2.6 | 84.6 |
| Pollination services | 1.5 | 0.5 | 0.5 | 0.9 | 0.5 | 1.2 | 0.6 | 15.5 | 2.4 | 81.0 |
| Package bees and queens | 0.5 | 0.6 | 1.4 | 0.3 | 0.3 | 1.1 | 0.6 | 5.4 | 1.1 | 92.6 |

Sample size = 663 (Full-time, 286; part-time, 291; hobby, 86).

Source: 1988 Honey Industry Survey.

Nine percent indicated they advertised their honey in local newspapers, and less than 4 percent used circulars, beekeeping journals, magazines, community bulletin boards, or direct mailings.

About half the beekeepers relied on word-of-mouth or other methods to market their honey. Part-time and hobby beekeepers relied more on word-of-mouth and advertising than did full-time beekeepers. Few beekeepers used advertising to market their beeswax, package bees and queens, and pollination services.

About three-fourths of the full-time beekeepers and 60 percent of all beekeepers surveyed contributed to the National Honey Board for promotional purposes (table 54). About one-third of the beekeepers promoted honey sales by providing free samples, giving demonstrations, and distributing recipes that use honey as an ingredient. Only 12.5 percent of full-time beekeepers did not use promotional activities in 1988, compared with 26 percent of part-time beekeepers and 40 percent of hobbyists.

About 87 percent of the packers used some advertising technique to market their honey (table 55). Twenty-two percent used a local newspaper, 19 percent used road signs, 10 percent used circulars, and 9 percent used direct mailings. Fifty-four percent of the importers and brokers used some form of advertisement in 1988. Circulars, local newspapers, magazines, and direct mailings were all used extensively by the importers and brokers who did advertise.

## Honey Price Support Program

The honey price support program was established because depressed honey prices and overcapacity developed within the industry after sugar rationing was terminated at the end of World War II. Congress also recognized the importance of beekeeping to pollinate commercial agricultural crops.

In 1947, The U.S. Department of Agriculture (USDA) helped the beekeeping industry dispose of large stocks of dark-colored, strong-flavored honey produced that year. A program started in March 1948 resulted in the purchase of nearly 11 million pounds of strong-flavored honey from packers who promised to pay beekeepers not less than 10 cents per pound for the honey, delivered to their plants. The honey was transferred to the Army and shipped to Germany for civilian feeding. The same year, the Government purchased an additional 5.6 million pounds of table-grade honey, which was distributed to school lunch and institutional feeding programs. Another 11.6 million pounds of honey were bought in early 1949.

In addition to removal through government purchases, the honey industry requested that the surplus be removed by payments to encourage exports and diversion of honey to new uses. The industry also made a concerted effort to have honey included in agricultural legislation as a commodity item subject to mandatory price support.

**Table 54--Promotional activities of beekeepers, by firm type, 1988**

| Activity | Firm type | | | Total |
|---|---|---|---|---|
| | Full-time | Part-time | Hobby | |
| | | *Percent* | | |
| Distribute recipes using honey | 42.8 | 29.6 | 19.2 | 34.2 |
| Give demonstrations | 33.9 | 30.7 | 21.8 | 31.0 |
| Distribute honey information | 29.5 | 20.2 | 6.4 | 22.6 |
| Distribute free samples | 34.7 | 33.9 | 29.5 | 33.7 |
| Publish newspaper articles | 6.6 | 6.2 | | 5.6 |
| Maintain observation hive | 14.4 | 14.8 | 9.0 | 13.9 |
| Contribute to the National Honey Board | 74.5 | 55.3 | 30.8 | 60.7 |
| Other | 13.3 | 12.8 | 6.4 | 12.2 |
| Did not participate | 12.5 | 26.1 | 39.7 | 21.8 |

Sample size = 606 (Full-time, 271; part-time, 257; hobby, 78).

Source: 1988 Honey Industry Survey.

**Table 55--Advertising activities of packers, importers, and brokers, by firm type, 1988**

| Firm type and product or service | Advertising activity | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Local newspaper | Circulars | Beekeeping journals | Magazines | Community bulletin boards | Direct mail | Road signs | Word of mouth | Other | Didn't advertise |
| | | | | | *Percent* | | | | | |
| Packers | | | | | | | | | | |
| Honey | 22.3 | 9.8 | NA | 5.4 | 2.7 | 8.9 | 18. | 60.7 | 25.0 | 13.4 |
| Honey with other products | 6.3 | 3.6 | 0.9 | 4.5 | NA | 4.5 | 2.7 | 14.3 | 6.3 | 67.9 |
| Packing services | NA | NA | NA | NA | NA | NA | NA | 8.0 | 1.8 | 78.6 |
| Other products or services | 2.7 | 2.7 | 1.8 | 0.9 | 0.9 | 3.6 | 0.9 | 16.1 | 5.4 | 70.5 |
| Importers and brokers | | | | | | | | | | |
| Honey | 23.1 | 30.8 | 7.7 | 15.4 | NA | 15.4 | NA | 23.1 | 7.7 | 46.2 |
| Honey with other nutritive sweeteners | 7.7 | NA | NA | 7.7 | NA | NA | NA | 7.7 | NA | 92.3 |
| Brokerage and importer services | NA | NA | NA | NA | NA | NA | NA | NA | NA | 100.0 |
| Other products or services | 7.7 | 7.7 | NA | 23.1 | NA | 7.7 | NA | 15.4 | 7.7 | 69.2 |

Sample size = 125 (Packers, 112; Importers and brokers, 13).
NA = None reported.

Source: 1988 Honey Industry Survey.

After hearings before a subcommittee of the House Committee on Agriculture, a price support program was mandated for honey by the Agricultural Act of 1949 and put into effect in 1950. It was deemed impractical for the Government to subsidize beekeepers through payments for pollination. The alternative was to support honey prices at levels that make it possible for beekeepers to maintain viable operations. The 1949 Act provided price supports on honey between 60 and 90 percent of parity.

## Description of Various Program Features

Under the 1950 and 1951 programs, the price of honey was supported through purchases, export payments, and diversion payments. The export and diversion payment programs remained in operation through the 1954 crop. The loan program and purchase program were initiated in 1952.

### *Support Through Loans*

Loans at the applicable price support rate on warehouse and farm-stored honey are made available to honey producers and honey marketing cooperatives who agree to comply with the program provisions. These loans are available no earlier than April 1 of the crop year and, prior to 1986, no later than January 1 of the year following the applicable crop year. In 1986, the loan availability date was extended 3 months from January 1 to March 31. Loans are made for 100 percent of the certified honey pledged as collateral in eligible farm storage or in a warehouse.

In accordance with a price support loan, a producer can store the honey, wait for a more advantageous market price, and repay the loan at any time prior to the loan's maturity date, which prior to 1986, was on demand, but not later than April 30 of the year following the year in which the honey is produced or extracted. In 1986, at the urging of the honey industry, the maturity date of honey loans was changed to 9 months after the month in which the loan was disbursed. Consequently, instead of all honey loans maturing at the same time, there are staggered maturity dates based on the time that the loan was disbursed.

A market loan option, contained in the Food Security Act of 1985 and continued in the Food, Agriculture,

Conservation, and Trade Act of 1990, allows beekeepers, at the discretion of the Secretary of Agriculture, to repay their loans at a rate that is lower than the announced loan rates. The Secretary has announced lower repayment rates for each honey crop since 1986. When a market loan option is in effect, interest is not charged on price support loans.

If loan recipients choose to sell their honey in the marketplace, the loan principal is repaid with interest. Borrowers unable or unwilling to market their honey for a price sufficient to repay the loan plus interest can forfeit the honey to the CCC. Since the loans are nonrecourse, the CCC is obligated to accept the honey as full payment of the loan. However, beginning with the 1989 honey crop, various limits have been placed on the amount of forfeitures that a producer can make with respect to honey price support loans for a crop of honey.

### *Other Program Features*

Ineligible floral sources. Certain honeys are ineligible to be pledged as collateral for a price support loan because of undesirable flavor characteristics as a result of their floral sources. Among these honeys are those derived from bittersweet, carrot, onion, prickly pear, and tarweed.

Table honey. The floral sources in this category are considered suitable for table use anywhere in the country, and include such honeys as those derived from clover, alfalfa, gallberry, tupelo, and similar mild-flavored honeys or mild-flavored blends.

Nontable honey. This category includes many floral sources accepted as table type in areas where they are produced, but not considered suitable for general national acceptance. In this group are honeys derived from aster, goldenrod, tulip poplar, and similarly flavored honeys or blends of such honeys.

### *Color and Area Differential Structure*

A price support differential based on color and class is applied to honey at the time of forfeiture. These differentials are calculated yearly based on the relative market values of each color and class of honey. A premium over the loan rate or a discount from the loan rate is applied at settlement of the forfeited loan collateral.

From 1952 to 1970, a honey support price differential was also in effect between the Western and Eastern States. The Western States included Montana, Wyoming, Colorado, and New Mexico. Honey produced in the Western States had a slightly lower support rate. This differential represented the normal average market differential between honey shipped from surplus-producing Mountain States and that shipped from surplus-producing Central States into Chicago. Under normal conditions, western producers found it necessary to ship some surplus honey to the East where there was a ready market. The differential permitted the continuation of that historical marketing pattern.

The differential was eliminated in the program for the 1971 crop. Both the American Beekeeping Federation and the American Honey Producers Association adopted resolutions in 1971 that included requests for elimination of the east-west differential. Western honey was supported at 0.4 cent per pound less than eastern honey in 1971 in recognition of the cost of moving surplus honey from the West to other areas of the country. Since 1952 when the differential was originally instituted, however, the patterns of honey movement from producing areas to consuming areas had changed. Movement was now predominately from midcontinent toward either coast, rather than from West to East. The differential was eliminated because there was no longer a significant surplus of honey in the West.

### *Support Through Purchases*

In years when a purchase option was available, honey producers who did not use the loan program could enter into purchase agreements with the CCC. While the producer had no obligation to deliver any honey to the CCC, the CCC was obligated to accept as much as 110 percent of the quantity of eligible honey covered by the agreement and pay the producer the applicable support price for the eligible honey delivered. Purchase agreements provided a means to support the honey price for producers who did not want to obtain a loan.

### *Packer Purchase Programs, 1950-51*

Price support of honey during the first 2 years of the honey program was carried out through purchase contracts between the CCC and packers of honey. These contracts provided that:

(1) Packers would purchase, to the extent of their storage and packing capacity, all the eligible honey offered by beekeepers at announced support prices.

(2) Packers would attempt to market such honey through the normal channels of trade.

(3) Honey that could not be marketed in normal channels of trade could be offered to the USDA at specified intervals.

(4) The price to packers for honey delivered to the USDA would be the support price plus an allowance for handling, storage, and any processing requested by the Department.

In 1951, two support prices were provided related to classifications of honey. To reflect the difference in value between the two categories, honeys of "general national acceptability" for table use were supported at 10.1 cents per pound to the producer, while honeys having "limited acceptability" were supported at 9 cents per pound.

The packer purchase programs left many beekeepers without direct price support. In some areas, packers failed to enter into program contracts with the CCC and thus had no obligation to pay beekeepers the effective support price. Beekeepers in such areas were forced to sell at the best price obtainable, often to the nonparticipating packers who used the situation to their advantage. The CCC acquired approximately 25 million pounds of honey in the 2 years when packer purchase programs were in effect.

### *Export and Diversion Payment Support, 1950-54*

Among the early price support provisions, export payments and payments for diversion of honey to new products were tried for a 5-year period.

Export payments. Payments at a specified rate per pound were made to exporters who met three conditions: (1) they exported honey meeting certain minimum grade requirements, (2) they paid the producer of the exported honey at least the support price for the exports, and (3) they provided evidence of export. Export payments ranged from a high of 4.5 cents per pound in 1950 to a low of 2.5 cents in 1954. Exports averaged 20.5 million pounds a year during the 5-year program.

Diversion payments. Under the diversion program introduced in 1950, users who diverted honey into new products received a payment at a specified rate per pound for the amount of honey diverted. Although numerous participants received approval to proceed with the diversion of honey in new products, only a small amount of honey actually was used and the program was abandoned in 1954 along with the export payment program.

### *Support Through Loan and Purchase Programs, 1952-85*

Considerable industry dissatisfaction developed in 1951, with respect to the level of support and the type of price support program (packer purchase agreements) then in operation. As a result, a loan program and a purchase agreement program were initiated in 1952. These programs continued through 1985, with the exception of 1975 and 1976, which featured only purchase agreement programs, without loan provisions.

### *Price Support Policy, 1986-95*

Food Security Act of 1985. The 1985 farm legislation made several changes in the honey program. First, the parity formula was dropped and progressively lower support prices were established for the 1986-90 honey crops. The 1986 national average support price was set at 64 cents per pound, down from 65.3 cents for the 1985 crop. The national average loan rates per pound for the 1987, 1988, 1989, and 1990 crops were set at 61, 59.1, 56.36, and 53.77 cents.

Second, a market loan option was authorized for the 1986-90 crops. The option, discretionary on the part of the Secretary of Agriculture, allows a producer to repay a loan at a level that the Secretary determines will minimize the number of loan forfeitures, not result in excessive total stocks of honey, reduce costs incurred by the Government in storing honey, and maintain the competitiveness of honey in domestic and export markets. The Secretary instituted the market loan option for the 1986-90 crops. To encourage use of the market loan option, the purchase feature of the earlier programs was dropped and the 1986-90 programs were designated "loans only" programs. Also, no interest was collected on price support loans repaid under the market loan option.

Amendments. Several legislative amendments were enacted following the 1985 Act that affected the honey price support program:

(1) Public Laws 99-500 and 99-591, signed October 18 and 30, 1986, limited the total amount of outstanding honey loans a person could have at any one time to $250,000, less any farm program payments received. For each of the 1987-90 crops, the total amount of payments a person could receive under one or more annual programs for wheat, feed grains, upland cotton, extra long staple cotton, rice, honey, and other commodities was limited to $250,000.

(2) Public Law 100-71, signed July 11, 1987, precluded redemption of honey price support loans with payment-in-kind certificates.

(3) Public Law 100-23, signed December 23, 1987 (Omnibus Budget Reconciliation Act of 1987), re-

moved the $250,000 outstanding loan limit for honey price support loans. However, the $250,000 limit on the gain from using the lower loan repayment option to redeem honey loans was still operative. Effective on the date of enactment, 1987 honey loan rates were reduced by 2 cents per pound. Also, the price support rates were to be reduced an additional three-quarter cent per pound for the 1988 honey crop, a half cent for the 1989 crop, and one-quarter cent per pound for the 1990 crop from the price support rates that would have otherwise been in effect.

(4) Public Law 100-460, signed October 1, 1988, placed a $250,000 limit per crop year on the amount of forfeitures of honey to the CCC by a producer beginning with the 1989 crop. The law made the forfeiture limit applicable only for those crops for which a market loan option is in effect. In addition, it made a producer personally liable for complete loan repayment, principal plus interest, once the forfeiture limit is reached.

Food, Agriculture, Conservation, and Trade Act of 1990. The 1990 farm legislation provided price support through loans, purchases, or other operations for the 1991-95 honey crops at not less than 53.8 cents per pound and reauthorized a market loan option for the 1991-95 honey crops. To cut administrative costs, loan deficiency payments (based on the difference between the loan rate and the market loan repayment rate) are available to producers in lieu of price support loans. The total amount of payments that a person may receive is $200,000 for the 1991 crop, $175,000 for 1992, $150,000 for 1993, and $125,000 for 1994 and subsequent crop years. Loan forfeiture limits were established at $200,000 for the 1991 crop year, $175,000 for 1992, $150,000 for 1993, and $125,000 for 1994 and subsequent crop years. A subsequent amendment to the 1990 Act provided for a budget-reduction assessment on honey production equal to 1 percent of the loan rate.

Omnibus Budget Reconciliation Act of 1993. The 1993 Act reduced the minimum honey loan rate from 53.8 cents a pound for the 1991-95 crops to 50 cents for the 1994 and 1995 crops, 49 cents for the 1996 crop, 48 cents for the 1997 crop, and 47 cents for the 1998 crop.

The 1993 Act also dropped the 1-percent (0.538 cent) assessment that growers paid on honey production. In addition, payment limits were reduced from $125,000 for the 1994 crop and subsequent crops to $100,000 for the 1995 crop, $75,000 for the 1996 crop, and $50,000 for the 1997 and 1998 crops.

The Agricultural Appropriations Act (P.L. 103-111) for FY 1994 reduced the amount of payments and loan forfeitures to zero dollars for 1994 crop honey in fiscal 1994.

**Beekeeper Use of the Honey Program**

The honey price support program has provided beekeepers with a market for honey at an assured price. The prices paid for honey by the Commodity Credit Corporation under the support program have exceeded those in the domestic and world markets since 1981. The national average price support rate moved above the domestic average honey price in 1982 by 2.6 cents per pound. This gap widened to 12.7 cents per pound by 1986, largely due to honey imports (fig. 42).

Beekeepers may have portions of their honey crop pledged as collateral for several price support loans. Therefore, the number of loans made is not the same as the number of beekeepers using the honey program. The number of loans made under the honey price support program increased throughout the 1980's. The increase in loan activity from 1982 through 1985 was largely due to the widening gap between the support price and the market price. During this period, the number of loans made increased from about 2,300 for the 1982 crop to 6,300 for the 1985 crop. Loan activity increased significantly thereafter, due to large crops in 1987 and 1988 and the lower loan repayment option in effect since the 1986 crop. The number of loans increased from about 8,100 for the 1986 crop to nearly 15,600 for the 1989 crop. For the 1990 honey crop, 15,386 loans were obtained by 5,028 honey producers.

Eighty-five percent of the beekeepers surveyed used the honey program at least once during 1981-88 (fig. 43).

Figure 42
## Honey imports and price, 1950-91

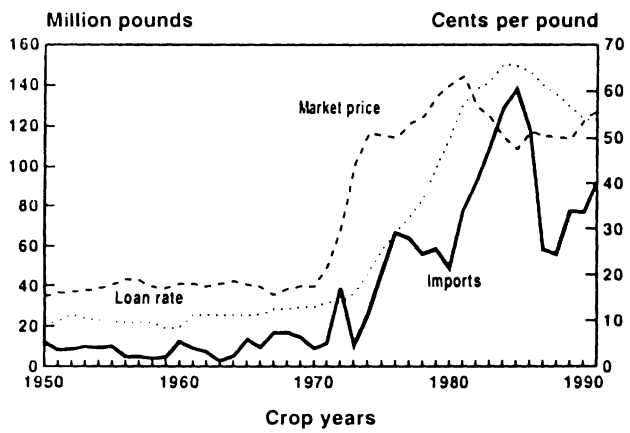
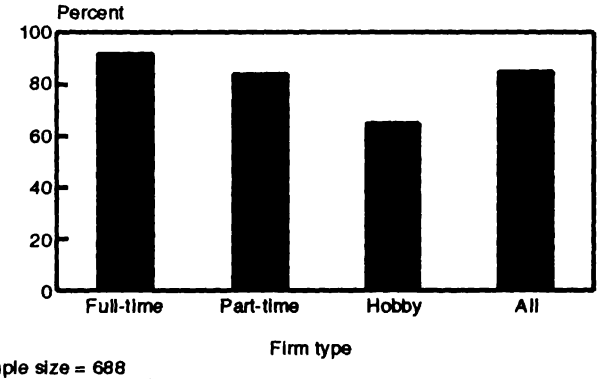


Figure 43
## Use of honey program, by firm type, 1981-88




Sample size = 688
Source: 1988 Honey Industry Survey.

By firm type, 92 percent of full-time beekeepers, 84 percent of part-time beekeepers, and 65 percent of hobbyists used the honey program.

Use of the honey program increased during 1981-88, from 6 percent of the respondents in 1981 to 67 percent in 1988 (fig. 44). From 1981 through 1984, full-time beekeepers were the dominant honey program users. After the lower loan repayment option was authorized by the 1985 Act, however, the rate of program participation increased for all three firm types, especially part-time and hobby beekeepers.

### Demographic Characteristics of Program Participants

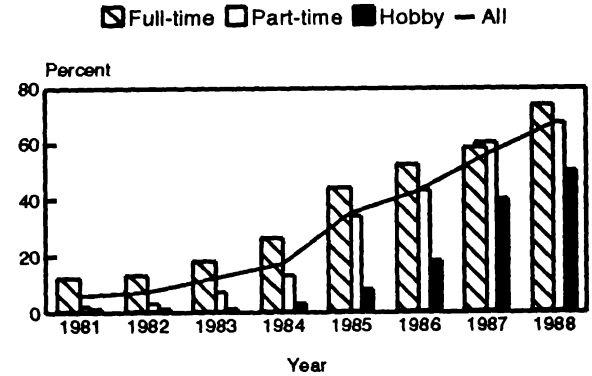
#### *Age*

Nearly three-fourths of the respondents who used the honey program in 1988 were age 35-64 (fig. 45). About one-third of the beekeepers who did not use the honey program were age 65 or older.

#### *Education*

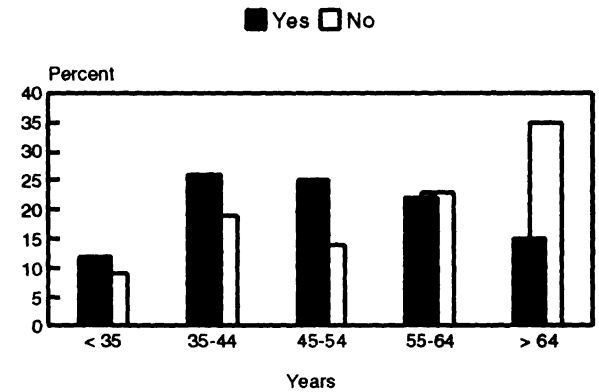
Eighty-six percent of the beekeepers using the honey program had at least a high school education, and slightly over half had attended college (fig. 46). Fifty-four percent had some college education, compared with 46 percent of nonusers. About 24 percent of the respondents who did not use the honey program had less than 12 years of education, compared with 13 percent of program participants.

Figure 44
## Participation in honey program, by firm type, 1981-88



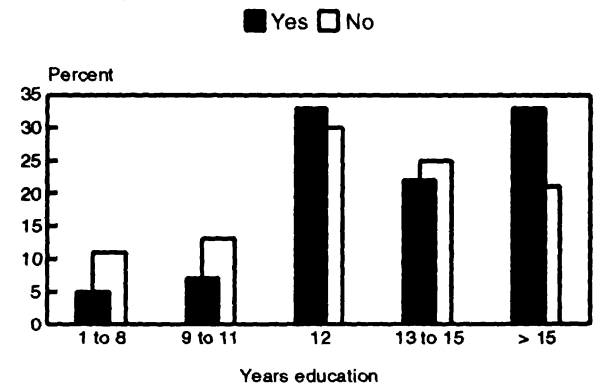

Sample size = 688
Source: 1988 Honey Industry Survey.

Figure 45
## Use of honey program, by age class, 1988




Sample size = 659
Source: 1988 Honey Industry Survey.

Figure 46
## Use of honey program, by years education, 1988




Sample size = 654
Source: 1988 Honey Industry Survey.

### *Firm Size*

The number of colonies increased during 1985-88 for all types of firms that used the honey program, but remained relatively unchanged for the nonusers (figs. 47, 48, and 49). Program users also maintained slightly more colonies than nonusers.

The average number of colonies maintained by full-time beekeepers who used the honey program increased about 7.5 percent between 1985 and 1988, from 1,618 to 1,737 colonies. The average number of colonies maintained by part-time beekeepers who used the honey program increased from 121 in 1985 to 148 in 1988, a 22-percent increase. The average number maintained by hobby beekeepers increased from 12 in 1985 to 17 in 1988, a 42-percent increase.

## Financial Characteristics of Program Participants

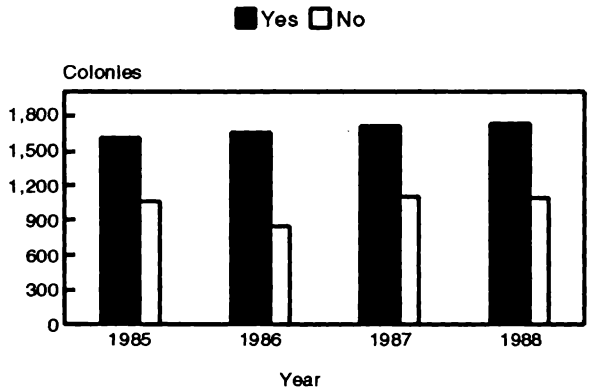
### *Total Assets*

Beekeepers who did not participate in the honey price support program had fewer assets than participants (fig. 50). Nearly half the beekeepers who did not use the program reported having less than $5,000 of total assets in their beekeeping operations in 1988. Forty-six percent of the program participants had $50,000 or more of total assets.

### *Total Debts*

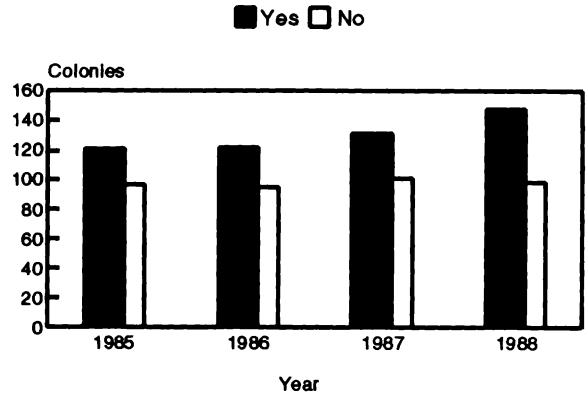
Beekeepers who used the honey program had slightly larger debts on their operations in 1988 than nonusers (fig. 51). However, nearly 80 percent of the nonusers and 58 percent of the users reported having no debt.

Figure 47
**Average number of colonies, by program participation, full-time beekeepers, 1988**



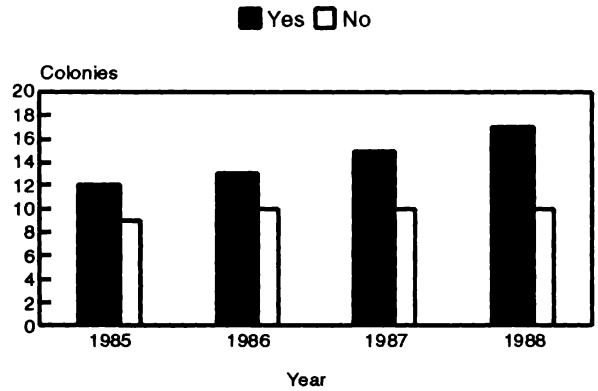

Source: 1988 Honey Industry Survey.

Figure 48
**Average number of colonies, by program participation, part-time beekeepers, 1988**



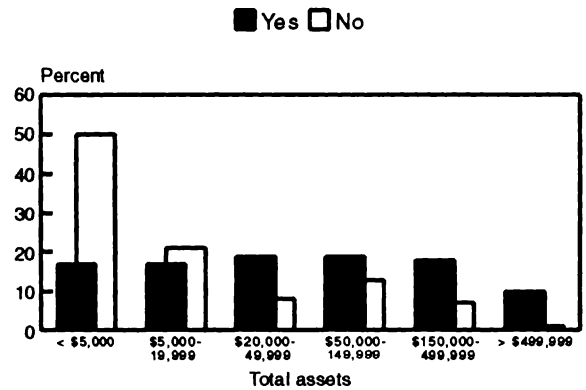

Source: 1988 Honey Industry Survey.

Figure 49
**Average number of colonies, by program participation, hobby beekeepers, 1988**



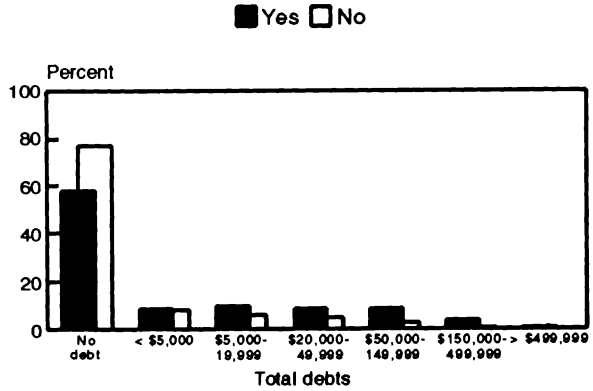

Source: 1988 Honey Industry Survey.

Figure 50
**Use of honey program, by total assets, 1988**



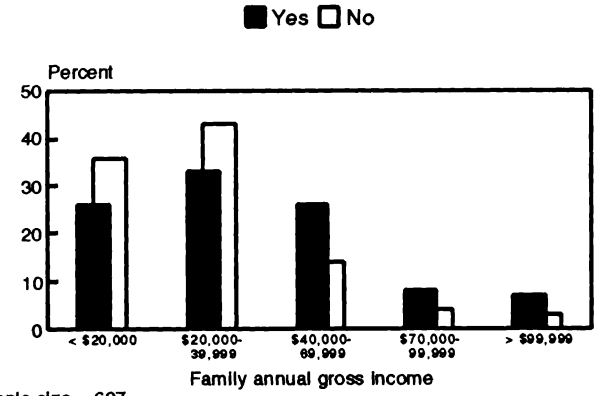

Sample size = 610
Source: 1988 Honey Industry Survey.

Figure 51
## Use of honey program, by total debts, 1988




Sample size = 614
Source: 1988 Honey Industry Survey.

Figure 52
## Use of honey program, by family income, 1988




Sample size = 607
Source: 1988 Honey Industry Survey.

### *Family Annual Gross Income*

Beekeepers with income from the honey price support program had higher gross family incomes in 1988 than beekeepers without honey program payments (fig. 52). Over one-third of the beekeepers who did not participate in the honey program in 1988 had gross family incomes of less than $20,000, compared with only one-quarter of the participants. Over 40 percent of the participants had gross family incomes of $40,000 or more, compared with only 21 percent of the nonparticipants.

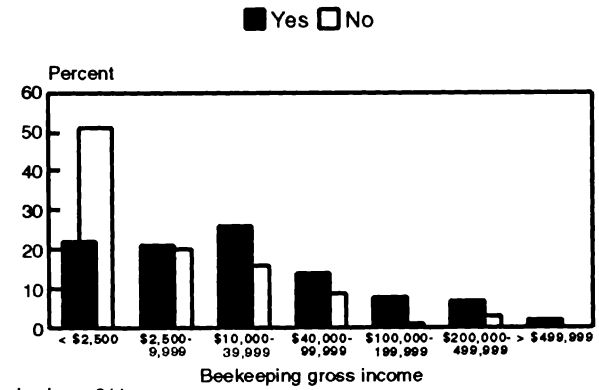
### *Gross Income*

Beekeepers who participated in the honey program also had higher gross incomes from their beekeeping operations. Around 50 percent of the nonparticipants had gross incomes of less than $2,500 in 1988, compared with 22 percent of the participants (fig. 53). Almost one-third of the participants had gross incomes of $40,000 or more, compared with 13 percent of the nonparticipants.

Honey price support payments comprised 53 percent of the gross income of beekeepers using the honey program from 1985-88 (fig. 54). If the government payments are deducted, however, program users received a greater proportion of their income from pollination, beeswax, package bees, and other sources than nonusers. Almost three-fourths of the income of nonusers came from honey sales.

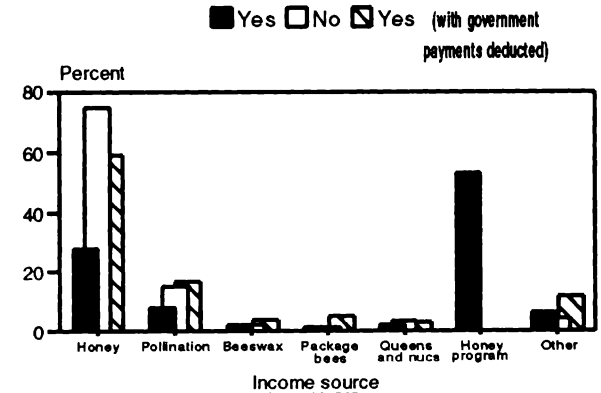
The average annual income from the honey program for full-time beekeepers during 1985-88 ranged from $57,677 to $75,543 (table 56). The range for part-time beekeepers was $4,260 to $6,409 and hobby beekeepers' honey program income ranged from $401 to $770.

Figure 53
## Use of honey program, by beekeeping gross income, 1988




Sample size = 611
Source: 1988 Honey Industry Survey.

Figure 54
## Sources of beekeeping income, by use of the honey program, 1985-88




Sample size: 1985=451; 1986=492; 1987=524; 1988=535
Source: 1988 Honey Industry Survey.

**Table 56—Average income from the honey program, by firm type, 1985-88**

| Year | Firm type | | |
|---|---|---|---|
| | Full-time | Part-time | Hobby |
| | | *Dollars* | |
| 1985 | 75,543 | 4,303 | 770 |
| 1986 | 60,983 | 4,454 | 401 |
| 1987 | 73,887 | 6,409 | 566 |
| 1988 | 57,677 | 4,260 | 517 |

Source: 1988 Honey Industry Survey.

### *Gross Receipts*

Beekeepers who used the honey price support program in 1988 had higher average gross receipts than nonparticipants (table 57). Gross receipts averaged $70.67 per colony and 84 cents per pound of honey for beekeepers in the honey program, compared with only $53.93 and 66 cents for nonparticipants.

Receipts specifically from the honey program averaged $29.84 per colony and 35 cents per pound of honey produced.[5] There was little difference, however, in the average government payments received by full-time, part-time, and hobby beekeepers who used the honey program. If the government payments are not considered in the value of honey marketed, the beekeepers who did not participate in the honey program sold their honey at a significantly higher price than the participants. Honey receipts averaged $41.65 per colony and 51 cents per pound of honey for nonparticipants, compared with $28.20 and 33 cents for participants.

[5]The 35-cent average payment per pound of honey pledged as collateral for CCC price support loans represents the weighted average payment to beekeepers for honey that was either forfeited to the CCC or redeemed by the beekeepers at the lower market loan repayment rate.

### *Gross Expenses*

Gross expenses were higher for beekeepers who received honey program payments in 1988 than for beekeepers who did not use the program (tables 58 and 59). The gross expenses for participants averaged $57.47 per colony and 68 cents per pound of honey produced, compared with $45.04 per colony and 55 cents per pound for nonparticipants. The higher cost items for participants included labor, bees, and supplies.

### *Net Income*

Program participants had higher average net incomes in 1988 than nonparticipants (fig. 55). Of the beekeepers who did not use the honey program, less than 1 percent had net incomes from their beekeeping operations in excess of $50,000, while 80 percent had

**Table 57—Average gross receipts from beekeeping products, services, and programs, by firms that did and did not participate in the honey price support program, 1988**

| Program income, firm type, and unit | Products, services, and programs | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|
| | Honey | Pollination services | Beeswax | Package bees | Queens and nucleus colonies | Government payments | Other | |
| | | | | *Dollars* | | | | |
| **Yes** | | | | | | | | |
| Full-time | | | | | | | | |
| Per colony | 27.67 | 6.89 | 1.44 | 0.81 | 0.88 | 30.04 | 3.14 | 70.87 |
| Per pound | 0.33 | 0.08 | 0.02 | 0.01 | 0.01 | 0.35 | 0.04 | 0.84 |
| Part-time | | | | | | | | |
| Per colony | 35.32 | 3.67 | 0.70 | 0.00 | 0.23 | 27.21 | 1.52 | 68.65 |
| Per pound | 0.47 | 0.05 | 0.01 | 0.00 | 0.00 | 0.36 | 0.02 | 0.91 |
| Hobby | | | | | | | | |
| Per colony | 19.51 | 0.00 | 0.86 | 0.00 | 0.00 | 31.24 | 0.22 | 51.83 |
| Per pound | 0.24 | 0.00 | 0.01 | 0.00 | 0.00 | 0.39 | 0.00 | 0.64 |
| Total | | | | | | | | |
| Per colony | 28.20 | 6.65 | 1.39 | 0.75 | 0.82 | 29.84 | 3.02 | 70.67 |
| Per pound | 0.33 | 0.08 | 0.02 | 0.01 | 0.01 | 0.35 | 0.04 | 0.84 |
| **No** | | | | | | | | |
| Full-time | | | | | | | | |
| Per colony | 41.97 | 7.68 | 0.85 | 1.15 | 2.16 | 0.00 | 0.95 | 54.76 |
| Per pound | 0.51 | 0.09 | 0.01 | 0.01 | 0.03 | 0.00 | 0.01 | 0.66 |
| Part-time | | | | | | | | |
| Per colony | 38.36 | 3.42 | 0.56 | 0.14 | 0.70 | 0.00 | 1.43 | 44.61 |
| Per pound | 0.51 | 0.04 | 0.01 | 0.00 | 0.01 | 0.00 | 0.02 | 0.59 |
| Hobby | | | | | | | | |
| Per colony | 23.25 | 0.00 | 0.16 | 0.00 | 0.00 | 0.00 | 0.00 | 23.41 |
| Per pound | 0.32 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 |
| Total | | | | | | | | |
| Per colony | 41.65 | 7.33 | 0.83 | 1.08 | 2.05 | 0.00 | 0.99 | 53.93 |
| Per pound | 0.51 | 0.09 | 0.01 | 0.01 | 0.03 | 0.00 | 0.01 | 0.66 |

Sample size:
Firms receiving honey program income = 266 (Full-time = 118, Part-time = 118, Hobby = 30).
Firms not receiving honey program income = 226 (Full-time = 106, Part-time = 92, Hobby = 28).

Source: 1988 Honey Industry Survey.

**Table 58--Average gross expenses of beekeeping operations with honey program income, by firm type, 1988**

| Cost item | Firm type | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Full-time | | Part-time | | Hobby | | Total | |
| | Per colony | Per pound | Per colony | Per pound | Per colony | Per pound | Per colony | Per pound |
| | *Dollars* | | | | | | | |
| Labor | 19.25 | 0.23 | 4.85 | 0.07 | 0.54 | 0.00 | 18.19 | 0.22 |
| Hired labor | 12.95 | 0.15 | 3.36 | 0.05 | 0.22 | 0.00 | 12.24 | 0.15 |
| Benefits | 1.46 | 0.02 | 0.23 | 0.00 | 0.00 | 0.00 | 1.37 | 0.02 |
| Other | 4.84 | 0.06 | 1.26 | 0.02 | 0.32 | 0.00 | 4.58 | 0.05 |
| Bees | 7.18 | 0.09 | 5.04 | 0.06 | 7.49 | 0.10 | 7.03 | 0.09 |
| Bee food | 5.07 | 0.06 | 1.80 | 0.02 | 1.44 | 0.02 | 4.83 | 0.06 |
| Queens and nucleus colonies | 1.46 | 0.02 | 1.62 | 0.02 | 3.87 | 0.05 | 1.48 | 0.02 |
| Package bees | 0.65 | 0.01 | 1.62 | 0.02 | 2.18 | 0.03 | 0.72 | 0.01 |
| Supplies | 8.02 | 0.10 | 11.27 | 0.15 | 13.28 | 0.16 | 8.26 | 0.09 |
| Equipment | 7.39 | 0.08 | 6.84 | 0.09 | 8.66 | 0.11 | 7.35 | 0.08 |
| Repairs/maint. | 3.70 | 0.04 | 2.88 | 0.04 | 3.91 | 0.05 | 3.64 | 0.04 |
| Gas and oil | 3.69 | 0.04 | 3.96 | 0.05 | 4.75 | 0.06 | 3.71 | 0.04 |
| Buildings | 3.41 | 0.04 | 10.47 | 0.14 | 3.37 | 0.05 | 3.93 | 0.04 |
| Repairs/maint. | 1.04 | 0.01 | 2.56 | 0.03 | 1.67 | 0.03 | 1.15 | 0.01 |
| Mortgage | 2.37 | 0.03 | 7.91 | 0.11 | 1.70 | 0.02 | 2.78 | 0.03 |
| Overhead | 9.54 | 0.12 | 6.95 | 0.10 | 1.56 | 0.02 | 9.33 | 0.12 |
| Utilities | 1.32 | 0.02 | 1.90 | 0.03 | 0.62 | 0.01 | 1.36 | 0.02 |
| Insurance | 2.33 | 0.03 | 1.46 | 0.02 | 0.10 | 0.00 | 2.27 | 0.03 |
| Taxes | 1.72 | 0.02 | 1.08 | 0.01 | 0.24 | 0.00 | 1.67 | 0.02 |
| Rent | 1.73 | 0.02 | 1.10 | 0.02 | 0.60 | 0.01 | 1.67 | 0.02 |
| Interest | 1.90 | 0.02 | 0.90 | 0.01 | 0.00 | 0.00 | 1.83 | 0.02 |
| Other | 0.54 | 0.01 | 0.51 | 0.01 | 0.00 | 0.00 | 0.53 | 0.01 |
| Marketing | 0.75 | 0.00 | 0.52 | 0.00 | 0.76 | 0.01 | 0.73 | 0.01 |
| Advertising | 0.43 | 0.00 | 0.19 | 0.00 | 0.11 | 0.00 | 0.41 | 0.01 |
| Subscriptions | 0.08 | 0.00 | 0.20 | 0.00 | 0.63 | 0.01 | 0.09 | 0.00 |
| Promotion | 0.17 | 0.00 | 0.08 | 0.00 | 0.00 | 0.00 | 0.17 | 0.00 |
| Fees | 0.07 | 0.00 | 0.05 | 0.00 | 0.02 | 0.00 | 0.06 | 0.00 |
| Other | 2.70 | 0.03 | 2.05 | 0.03 | 2.78 | 0.03 | 2.65 | 0.03 |
| Total | 58.24 | 0.69 | 47.99 | 0.64 | 38.44 | 0.48 | 57.47 | 0.68 |

Sample size = 266 (Full-time, 118; Part-time, 118; Hobby, 30).

Source: 1988 Honey Industry Survey.

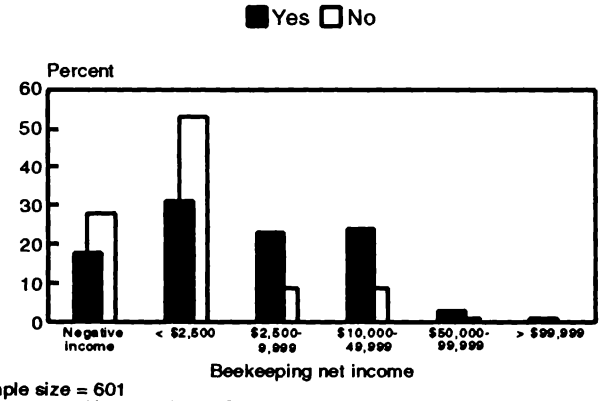
**Table 59--Average gross expenses of beekeeping operations without honey program income, by firm type, 1988**

| Cost item | Firm type: Full-time | | Part-time | | Hobby | | Total | |
|---|---|---|---|---|---|---|---|---|
| | Per colony | Per pound | Per colony | Per pound | Per colony | Per pound | Per colony | Per pound |
| | *Dollars* | | | | | | | |
| Labor | 12.77 | 0.15 | 2.04 | 0.02 | 0.58 | 0.01 | 11.95 | 0.14 |
| Hired labor | 9.99 | 0.12 | 1.74 | 0.02 | 0.58 | 0.01 | 9.36 | 0.11 |
| Benefits | 0.37 | 0.00 | 0.09 | 0.00 | 0.00 | 0.00 | 0.35 | 0.00 |
| Other | 2.41 | 0.03 | 0.21 | 0.00 | 0.00 | 0.00 | 2.24 | 0.03 |
| Bees | 4.55 | 0.06 | 4.60 | 0.06 | 3.21 | 0.04 | 4.55 | 0.06 |
| Bee food | 3.00 | 0.04 | 2.64 | 0.04 | 0.97 | 0.01 | 2.97 | 0.04 |
| Queens and nucleus colonies | 1.03 | 0.01 | 1.68 | 0.02 | 2.12 | 0.03 | 1.08 | 0.01 |
| Package bees | 0.52 | 0.01 | 0.28 | 0.00 | 0.12 | 0.00 | 0.50 | 0.01 |
| Supplies | 6.62 | 0.08 | 8.60 | 0.11 | 13.52 | 0.19 | 6.79 | 0.08 |
| Equipment | 7.47 | 0.10 | 8.19 | 0.11 | 6.80 | 0.10 | 7.53 | 0.09 |
| Repairs/maint. | 3.72 | 0.05 | 4.33 | 0.06 | 1.46 | 0.02 | 3.76 | 0.05 |
| Gas and oil | 3.75 | 0.05 | 3.86 | 0.05 | 5.34 | 0.08 | 3.77 | 0.04 |
| Buildings | 3.86 | 0.05 | 3.28 | 0.05 | 0.02 | 0.00 | 3.81 | 0.05 |
| Repairs/maint. | 1.45 | 0.02 | 2.08 | 0.03 | 0.02 | 0.00 | 1.49 | 0.02 |
| Mortgage | 2.41 | 0.03 | 1.20 | 0.02 | 0.00 | 0.00 | 2.32 | 0.03 |
| Overhead | 7.96 | 0.09 | 7.13 | 0.10 | 3.80 | 0.05 | 7.89 | 0.09 |
| Utilities | 1.45 | 0.02 | 1.93 | 0.03 | 1.65 | 0.02 | 1.48 | 0.02 |
| Insurance | 1.88 | 0.02 | 1.04 | 0.02 | 0.00 | 0.00 | 1.83 | 0.02 |
| Taxes | 1.79 | 0.02 | 2.27 | 0.03 | 1.22 | 0.02 | 1.82 | 0.02 |
| Rent | 1.09 | 0.01 | 1.60 | 0.02 | 0.90 | 0.01 | 1.12 | 0.01 |
| Interest | 1.40 | 0.02 | 0.17 | 0.00 | 0.00 | 0.00 | 1.31 | 0.02 |
| Other | 0.35 | 0.00 | 0.12 | 0.00 | 0.03 | 0.00 | 0.33 | 0.00 |
| Marketing | 0.23 | 0.00 | 0.53 | 0.01 | 0.19 | 0.01 | 0.24 | 0.01 |
| Advertising | 0.11 | 0.00 | 0.13 | 0.01 | 0.00 | 0.01 | 0.11 | 0.01 |
| Subscriptions | 0.03 | 0.00 | 0.11 | 0.00 | 0.19 | 0.00 | 0.03 | 0.00 |
| Promotion | 0.06 | 0.00 | 0.12 | 0.00 | 0.00 | 0.00 | 0.06 | 0.00 |
| Fees | 0.03 | 0.00 | 0.17 | 0.00 | 0.00 | 0.00 | 0.04 | 0.00 |
| Other | 2.40 | 0.03 | 0.97 | 0.01 | 0.00 | 0.00 | 2.28 | 0.03 |
| Total | 45.86 | 0.56 | 35.34 | 0.47 | 28.12 | 0.40 | 45.04 | 0.55 |

Sample size = 226 (Full-time, 106; Part-time, 92; Hobby, 28).

Source: 1988 Honey Industry Survey.

Figure 55
## Use of honey program, by beekeeping net income, 1988




Sample size = 601
Source: 1988 Honey Industry Survey.

less than $2,500. About half the respondents using the honey program had net incomes from their beekeeping operations of less than $2,500.

Beekeepers with honey program income had higher net incomes from beekeeping operations than nonparticipants (table 60). Net incomes for participants averaged $13.20 per colony and 16 cents per pound of honey produced, compared with $8.89 per colony and 11 cents per pound for nonparticipants. Part-time beekeepers had the highest average net income within the honey program user and nonuser groups.

Twenty-one percent of the beekeepers with honey program income and 40 percent without program income had negative net incomes per colony and per pound of honey produced in 1988 (tables 61 and 62).

**Table 60—Average net income of beekeeping operations that did and did not participate in the honey price support program, 1988**

| Program income and item | Firm type: Full-time Per colony | Full-time Per pound | Part-time Per colony | Part-time Per pound | Hobby Per colony | Hobby Per pound | Total Per colony | Total Per pound |
|---|---|---|---|---|---|---|---|---|
| | *Dollars* | | | | | | | |
| **Yes** | | | | | | | | |
| Gross receipts | 70.87 | 0.84 | 68.65 | 0.91 | 51.83 | 0.64 | 70.67 | 0.84 |
| Gross expenses | 58.24 | 0.69 | 47.99 | 0.64 | 38.44 | 0.48 | 57.47 | 0.68 |
| Net income[1] | 12.63 | 0.15 | 20.66 | 0.27 | 13.39 | 0.16 | 13.20 | 0.16 |
| **No** | | | | | | | | |
| Gross receipts | 54.76 | 0.66 | 44.61 | 0.59 | 23.41 | 0.33 | 53.93 | 0.66 |
| Gross expenses | 45.86 | 0.56 | 35.34 | 0.47 | 28.12 | 0.40 | 45.04 | 0.55 |
| Net income[1] | 8.90 | 0.10 | 9.27 | 0.12 | -4.71 | -0.07 | 8.89 | 0.11 |

[1]Return to unpaid land, labor, capital, and management.
Sample size:
Firms receiving honey program income = 266 (Full-time, 118; Part-time, 118; Hobby, 30).
Firms not receiving honey program income = 226 (Full-time, 106; Part-time, 92; Hobby, 28).

Source: 1988 Honey Industry Survey.

**Table 61—Distribution of beekeeping firms by receipt of honey program income, by net income per colony, 1988**

| Program income and firm type | Net income per colony (dollars): Costs exceeded Income | 0.00-9.99 | 10.00-24.99 | 25.00-49.99 | 50.00-74.99 | 75.00-99.99 | 100.00-149.99 | 150.00 or more |
|---|---|---|---|---|---|---|---|---|
| | *Percent* | | | | | | | |
| **Yes** | | | | | | | | |
| Full-time | 19 | 11 | 23 | 24 | 11 | 6 | 4 | 2 |
| Part-time | 19 | 13 | 21 | 28 | 9 | 4 | 5 | 1 |
| Hobby | 33 | 13 | 20 | 18 | 3 | 7 | 3 | 3 |
| All | 21 | 12 | 22 | 25 | 9 | 5 | 4 | 2 |
| **No** | | | | | | | | |
| Full-time | 36 | 13 | 22 | 23 | 3 | 2 | 1 | 0 |
| Part-time | 42 | 10 | 22 | 15 | 5 | 4 | 1 | 1 |
| Hobby | 50 | 14 | 0 | 29 | 4 | 0 | 0 | 4 |
| All | 40 | 12 | 19 | 20 | 4 | 3 | 1 | 1 |

Sample size:
Firms receiving honey program income = 266 (Full-time, 118; Part-time, 118; Hobby,30).
Firms not receiving honey program income = 226 (Full-time, 106; Part-time, 92; Hobby, 28).

Source: 1988 Honey Industry Survey.

**Table 62—Distribution of beekeeping firms by receipt of honey program income, by net income per pound of honey, 1988**

| Program income and firm type | Net income per pound (dollars): Costs exceeded Income | 0.00-0.09 | 0.10-0.24 | 0.25-0.49 | 0.50-0.74 | 0.75-0.99 | 1.00-1.24 | 1.25 or more |
|---|---|---|---|---|---|---|---|---|
| | Percent | | | | | | | |
| **Yes** | | | | | | | | |
| Full-time | 19 | 7 | 19 | 25 | 14 | 7 | 3 | 6 |
| Part-time | 19 | 8 | 10 | 35 | 10 | 10 | 2 | 6 |
| Hobby | 33 | 10 | 7 | 23 | 8 | 13 | 3 | 3 |
| All | 20 | 8 | 14 | 29 | 12 | 9 | 3 | 5 |
| **No** | | | | | | | | |
| Full-time | 36 | 10 | 15 | 25 | 8 | 2 | 4 | 0 |
| Part-time | 42 | 5 | 12 | 25 | 8 | 3 | 0 | 5 |
| Hobby | 50 | 7 | 7 | 18 | 11 | 0 | 4 | 3 |
| All | 40 | 8 | 13 | 24 | 8 | 2 | 3 | 3 |

Sample size:
Firms receiving honey program income = 266 (Full-time, 118; Part-time, 118; Hobby, 30).
Firms not receiving honey program income = 226 (Full-time, 106; Part-time, 92; Hobby, 28).

Source: 1988 Honey Industry Survey.

Twenty percent of the beekeepers that used the honey program in 1988 had a net income of $50 or more per colony, compared with 9 percent of the nonusers.

Since 1988, the proportion of beekeeping incomes attributed to the honey price support program has declined significantly. In fiscal 1988, net government expenditures for the honey program peaked at $100 million. Due to changes made in the honey program since that time, including reductions in the price support rate from 59.1 cents a pound in 1988 to 53.8 cents in 1992, net government outlays have been reduced to $16 million in fiscal 1992. Also, the average value of U.S. honey production has increased from 50 cents a pound in 1988 to 55.8 cents in 1992.

## Correlation Analysis of Selected Beekeeper Characteristics

Correlation analysis was used to determine the relationship between selected variables for full-time, part-time, and hobby beekeepers. Correlation analysis measures the degree of closeness of the linear relationship between two variables. The relationship is measured by a correlation coefficient. A correlation coefficient always lies between -1 and +1. Positive correlation coefficients indicate a tendency for two variables to increase or decrease together. When a coefficient is negative, the one variable tends to increase when the second decreases, and vice versa. A correlation of 0 denotes no relation between the two variables, and a 1 denotes a perfect relationship. These coefficients are compiled using a subset of the 688 beekeepers who responded to all variables in the matrix.

### Full-Time Beekeepers

The correlation matrix for selected structural characteristics of full-time beekeepers is shown in table 63. The strongest relationship, a correlation coefficient of .9565, was found between labor expenses and gross expenses. This indicates that as labor expenses increase, there is a closely related increase in gross expenses. Such a relationship is to be expected, however, since labor is one of the items included in a beekeeping firm's gross expenses.

A strong relationship also existed between labor expenses and government payments (.8369). This is to be expected since full-time beekeeping firms with higher levels of government payments are the firms with the larger number of colonies using the most hired labor. Gross expenses and labor expenses are both positively correlated with gross receipts, at .8647 and .8412. This indicated that firms with larger labor and gross expenses tend to have more gross receipts, probably due to the larger operations and more honey production. The number of colonies were found to be closely associated with labor expenses (.7830), gross expenses (.7490), government payments (.7110), and gross receipts (.7475). There was a weak positive correlation (.1464) between government payments and receipt of pollination income.

The strongest negative correlation (-.2708) was between operator age and education. It indicates that the older full-time beekeepers tend to have completed less years of schooling than younger ones. Age was also negatively correlated with honey production and government payments. Honey production per colony was negatively correlated (-.1019) with pollination income, which suggests that honey production per colony is likely to be lower for beekeepers who are actively involved in providing paid pollination services.

### Part-Time Beekeepers

The strongest correlation for part-time beekeepers (.6498) was between pollination receipts and labor

**Table 63--Correlation matrix for selected beekeeper characteristics, full-time firms, 1985-88 average**

| Characteristics | Colonies | Honey production per colony | Miles transported per colony | Operator age | Operator education | Gross expenses | Labor expenses | Gross receipts | Pollination receipts | Government payments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | *Correlation coefficient* | | | | | |
| Colonies | 1.0000 | | | | | | | | | |
| Honey production/colony | 0.0478 | 1.0000 | | | | | | | | |
| Miles transported/colony | -0.0577 | 0.2067 | 1.0000 | | | | | | | |
| Operator age | 0.1031 | -0.0319 | 0.0621 | 1.0000 | | | | | | |
| Operator education | 0.0489 | 0.0344 | -0.0557 | -0.2708 | 1.0000 | | | | | |
| Gross expenses | 0.7490 | 0.2827 | 0.0353 | 0.0127 | 0.0523 | 1.0000 | | | | |
| Labor expenses | 0.7830 | 0.2185 | -0.0180 | 0.0648 | 0.0476 | 0.9565 | 1.0000 | | | |
| Gross receipts | 0.7475 | 0.3652 | 0.0551 | 0.0299 | 0.0253 | 0.8647 | 0.8412 | 1.0000 | | |
| Pollination receipts | 0.2393 | -0.1019 | 0.0390 | 0.0380 | 0.0513 | 0.1999 | 0.1547 | 0.2894 | 1.0000 | |
| Government payments | 0.7110 | 0.2087 | -0.0044 | -0.0047 | 0.0569 | 0.7583 | 0.8369 | 0.7687 | 0.1464 | 1.0000 |

Sample size = 262.

Source: 1988 Honey Industry Survey.

expenses (table 64). This suggests that part-time beekeepers with larger pollination receipts also have greater hired labor expenses. The correlation between pollination receipts and labor expenses for full-time beekeepers was only .1547. The weaker relationship in the case of full-time beekeepers may result from the fact that full-time beekeepers annually employ a large amount of hired labor regardless of whether they receive pollination income. Part-time beekeepers may incur hired labor expenses primarily when providing paid pollination services.

Strong correlations also occurred between gross expenses and gross receipts (.6396), gross expenses and labor expenses (.5587), and labor expenses and gross receipts (.5075) for part-time beekeepers. These latter correlations, however, were all weaker than the ones observed for full-time beekeepers: (.8647), (.9565), and (.8412). All the remaining correlations for part-time beekeepers were less than .5000.

Although weak, the correlations between part-time beekeepers' ages and the other characteristics is negative. This could be the result of part-time beekeepers reducing the size of their beekeeping operations as they grow older. Smaller operations would tend to have less honey production, receipts, and expenses. The correlation between honey production and pollination receipts was negative (-.1111). There was a positive correlation (.1675) for the part-time beekeepers between government payments and pollination receipts.

### Hobby Beekeepers

The strongest correlation for the hobby beekeepers (.5731) was between honey production and gross receipts (table 65). The relationship was even stronger than it was for full-time (.3652) and part-time (.4021) beekeepers. This relationship indicates that hobby beekeepers are more dependent on honey sales as a source of income than other firm types (see also figure 12).

With the exception of gross expenses (.0327) and colony size (.0118), hobby beekeepers' ages were negatively related with the other characteristics. Pollination receipts were negatively correlated with all the variables examined for hobby beekeepers.

**Table 64--Correlation matrix for selected beekeeper characteristics, part-time firms, 1985-88 average**

| Characteristics | Colonies | Honey production per colony | Miles transported per colony | Operator age | Operator education | Gross expenses | Labor expenses | Gross receipts | Pollination receipts | Government payments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | *Correlation coefficient* | | | | | |
| Colonies | 1.0000 | | | | | | | | | |
| Honey production/colony | 0.0969 | 1.0000 | | | | | | | | |
| Miles transported/colony | 0.0264 | 0.0957 | 1.0000 | | | | | | | |
| Operator age | -0.0273 | -0.1401 | -0.0232 | 1.0000 | | | | | | |
| Operator education | 0.0390 | 0.0768 | -0.0650 | -0.3153 | 1.0000 | | | | | |
| Gross expenses | 0.4085 | 0.2516 | 0.0266 | -0.0996 | 0.0509 | 1.0000 | | | | |
| Labor expenses | 0.1579 | 0.1219 | -0.0768 | -0.0366 | 0.1193 | 0.5587 | 1.0000 | | | |
| Gross receipts | 0.4936 | 0.4021 | 0.1307 | -0.0365 | 0.1488 | 0.6396 | 0.5075 | 1.0000 | | |
| Pollination receipts | 0.1853 | -0.1111 | 0.0889 | -0.0513 | 0.1990 | 0.3125 | 0.6498 | 0.4436 | 1.0000 | |
| Government payments | 0.3195 | 0.2657 | -0.0081 | -0.1767 | 0.0778 | 0.1017 | 0.0979 | 0.2777 | 0.1675 | 1.0000 |

Sample size = 196.

Source: 1988 Honey Industry Survey.

**Table 65--Correlation matrix for selected beekeeper characteristics, hobby firms, 1985-88 average**

| Characteristics | Colonies | Honey production per colony | Miles transported per colony | Operator age | Operator education | Gross expenses | Labor expenses | Gross receipts | Pollination receipts | Government payments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | *Correlation coefficient* | | | | | |
| Colonies | 1.0000 | | | | | | | | | |
| Honey production/colony | 0.0465 | 1.0000 | | | | | | | | |
| Miles transported/colony | 0.2089 | 0.2453 | 1.0000 | | | | | | | |
| Operator age | 0.0118 | -0.1959 | -0.0991 | 1.0000 | | | | | | |
| Operator education | -0.0235 | 0.3943 | -0.1114 | -0.4444 | 1.0000 | | | | | |
| Gross expenses | 0.2852 | 0.0725 | 0.0821 | 0.0327 | -0.0246 | 1.0000 | | | | |
| Labor expenses | -0.0149 | 0.0403 | 0.0650 | -0.1463 | 0.0621 | 0.1197 | 1.0000 | | | |
| Gross receipts | 0.4025 | 0.5731 | 0.2201 | -0.0535 | 0.2372 | 0.3707 | 0.0091 | 1.0000 | | |
| Pollination receipts | -0.2209 | -0.1669 | -0.0436 | -0.2270 | -0.0771 | -0.0904 | -0.0301 | -0.1323 | 1.0000 | |
| Government payments | 0.2694 | 0.1293 | -0.0337 | -0.0047 | 0.1708 | -0.0069 | -0.0301 | 0.1445 | -0.0227 | 1.0000 |

Sample size = 45.

Source: 1988 Honey Industry Survey.

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U.S. Department of Agriculture
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SUMMARY OF REPORT AER-676

# Hired Labor Most Important to Fruit, Vegetable, Horticultural Farms

December 1993

*Contact: Vic Oliveira, 202-219-0932*

Fruit, vegetable, and horticultural specialty (FVH) farms spend nearly six times as much on hired and contract labor per farm as do other farm types. According to a new report by USDA's Economic Research Service, *Hired Farm Labor Use on Fruit, Vegetable, and Horticultural Specialty Farms*, FVH farms that used hired and/or contract labor had average labor expenses of $52,446 per farm, compared with $8,886 for all other types of farms.

Because of the unique nature of FVH production, its use of labor differs markedly from that on other types of farms. Although much of U.S. farm production is mechanized, many FVH crops require hand harvesting to preserve the quality and value of the produce, especially that intended for fresh market where consumers prefer an unblemished appearance. Thus, labor is the largest input expense on FVH farms, accounting for 37-44 percent of total production expenses, compared with an average of 8 percent on all other types of farms.

## Factors Likely To Affect Farm Labor Patterns

**Immigration Reform**. FVH production requires a large number of workers for short, intermittent periods during critical planting and harvest seasons. Migrant farmworkers and undocumented foreign workers are often associated with seasonal hand-harvest jobs in the FVH sector. Changes in immigration policy or stricter enforcement may affect the supply of foreign farmworkers, while changes in Federal laws and programs designed to benefit farmworkers may make seasonal work more attractive to both U.S. and foreign workers.

**Consumer Demand**. The share of all U.S. farm labor expenses attributed to FVH farms grew from 34 percent in 1974 to 41 percent in 1987. Population growth and an increased concern over a healthy diet have increased consumer demand for fresh fruits and vegetables in the United States. The production of horticultural specialties has experienced an even greater increase than fruits and vegetables. As measured by grower cash receipts, the output of greenhouse and nursery crops increased 7 percent annually between 1970 and 1992.

**Foreign Trade**. Modification of current agricultural trade policies could alter the flow of fruits, vegetables, and horticultural specialties between the United States and other countries, and thus affect the demand for labor in the United States. NAFTA's impact on the U.S. farm labor market is unclear. The cumulative effect of increases and decreases in U.S. production for various commodities (each demanding varied amounts of labor) will determine the net effect of NAFTA on the demand for labor.

## To Order This Report...

The information presented here is excerpted from *Hired Farm Labor Use on Fruit, Vegetable, and Horticultural Specialty Farms*, AER-676, by Victor J. Oliveira, Anne B.W. Effland, Jack L. Runyan, and Shannon Hamm. Cost is $9.

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SUMMARY OF REPORT SB-868

# Continued Growth in U.S. Corn Sweetener Industry

November 1993

*Contact: Fred Gray, (202) 219-0888*

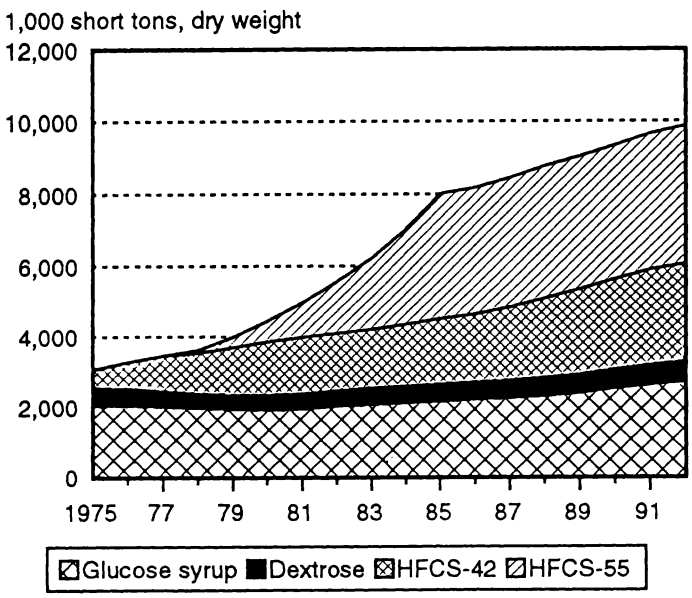
The United States is both the world's largest corn producer, and the world's largest manufacturer of corn sweeteners. U.S. corn sweetener production uses 7 to 10 percent of the annual U.S. corn crop. U.S. corn sweetener output in 1992 totaled more than 10 million tons, about double the 1980 level. Use of corn sweeteners in food and beverages in the United States has exceeded that for cane and beet sugar since 1985.

*U.S. Corn Sweetener Statistical Compendium*, a new report by USDA's Economic Research Service, provides analysis and data about the growing U.S. corn sweetener industry not previously available in one report.

The 10 U.S. firms that manufacture corn sweeteners use over 600 million bushels of corn annually to produce corn sweeteners at 21 facilities (14 in the Corn Belt) in 11 States.

In 1992, corn sweeteners accounted for 54 percent of total caloric sweetener use, sugar for 45 percent, with honey and other natural sweeteners such as maple syrup and edible molasses, accounting for the remainder. High fructose corn syrup (HFCS) accounts for about 67 percent of total domestic corn sweetener use, glucose syrup for 27 percent, and dextrose, the rest.

## U.S. corn sweetener consumption




In 1992, beverages accounted for 71 percent of total domestic HFCS use, 91 percent for HFCS-55, and 42 percent for HFCS-42. (HFCS-55, a more recent formulation of high fructose corn syrup, is as sweet as sugar and has a chemical makeup of 55 percent fructose. The original HFCS, now called HFCS-42 is 42 percent fructose.) HFCS-55 is used chiefly as a sweetener of soft drinks. HFCS is viewed as a less expensive replacement for cane and beet sugar where its use is technically feasible. Sweetness is, on the other hand, a secondary consideration in the use of glucose syrup and dextrose in food and beverages. Their primary use as an ingredient is to improve a food's desirable characteristics, such as texture and appearance.

While beverage use (mostly soft drinks) is the major market for HFCS, use in commercially prepared foods is the major market (around 80 percent) for glucose syrup and dextrose. And unlike HFCS, most beverage use of glucose syrup and dextrose is as a feedstock for yeast in malt beverages. In addition, nonfood use of glucose syrup and dextrose is substantial, while only minimal for HFCS.

U.S. trade in corn sweeteners is relatively small, much of it being HFCS traded with Canada.

### To Order This Report...

The information presented here is excerpted from ***U.S. Corn Sweetener Statistical Compendium,*** SB-868, by Fred Gray, Peter Buzzanell, and William Moore. Cost is $9.00 ($11.25 for orders shipped to foreign addresses, including Canada).

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SUMMARY OF REPORT SB-875

# U.S. Exports More, Consumes Less Fresh Fruit than Previously Estimated

April 1993

*Contact: Diane Bertelsen, 202-219-0884*

During 1978-89, the United States exported more fresh fruit than had been reported by the Bureau of the Census. Import data made available by Statistics Canada revealed that some shipments of fresh fruit from the United States to Canada had not been counted by the Bureau. Using the Canadian data raised total U.S. fruit exports and lowered consumption. U.S. consumption of citrus fruits was 5 percent lower and consumption of noncitrus fruits was 1 percent lower than previously estimated. Since 1990, the Bureau of the Census has used the Canadian import data as a measure of U.S. exports to Canada. This bulletin reports the revised U.S. export and per capita consumption for 13 fresh fruits: grapefruit, lemons, limes, oranges, tangerines, apples, avocados, sweet cherries, grapes, peaches and nectarines, pears, prunes and plums and strawberries. The report also includes 40-year trends for fresh fruit consumption.

These estimates are published in a new report from USDA's Economic Research Service, *U.S. Fresh Fruit Export and Consumption Estimates, 1978-92.*

Substituting Canadian import data for U.S. export data reduced annual estimates of fresh-market orange and grape consumption the most, an average 7 percent. Exports of these commodities to Canada were substantially underreported, and Canada was a major destination, receiving 50-75 percent of all U.S. orange and grape exports. Because exports averaged about 25 percent of orange and grape supplies during the study period, raising exports markedly reduced consumption.

Annual consumption estimates for fresh-market avocados, limes, peaches, and strawberries were lowered just 2-3 percent, on average, despite substantial underreporting of U.S. exports during 1978-89. Canada was the destination of more than 80 percent of U.S. peach and strawberry exports, about 70 percent of limes, and nearly 50 percent of U.S. avocado exports. However, even after the author revised the data, avocado exports were less than 10 percent of total U.S. supplies. Thus, upward adjustments of exports had little impact on consumption estimates.

Annual consumption estimates for fresh-market apples were revised downward barely 1 percent, on average. Canada accounted for about 25 percent of all U.S. apple exports and adjusting for underreporting raised total U.S. apple exports an average of only 10 percent. The effects of higher exports on consumption estimates were dampened further because exports averaged just 12 percent of U.S. fresh-market apple supplies during the study period.

Pear consumption estimates were reduced only about 2 percent because exports were just 14 percent of supplies. Although Canada accounted for about 50 percent of U.S. pear exports, the degree of underreporting was less than for the other fruits. Total annual pear exports were revised upward an average of 15 percent.

Grapefruit exports, however, were relatively large compared with total supplies, averaging nearly 30 percent. Thus, modest adjustments for underreported exports to Canada lowered annual consumption estimates by an average of 5 percent during the study period, 1978-89.

## To Order This Report...

The information presented here is excerpted from ***U.S. Fresh Fruit Export and Consumption Estimates, 1978-92,*** SB-875, by Diane Bertelsen. The cost is $9.00.To order, dial **1-800-999-6779** (toll free in the United States and Canada) and ask for the report by title.

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Economic Research Service

SUMMARY OF REPORT SB- 869

# U.S. Tobacco, Highly Prized Overseas, Shows Production Declines at Home

April 1994

*Contact: Laverne Creek, 202-219-0890*

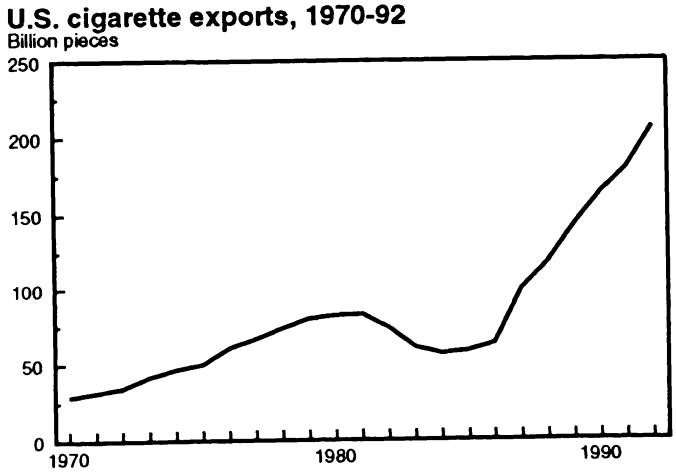
The United States is the world's leading tobacco exporter and importer and the second largest tobacco producer behind China. Tobacco is grown in 21 States, with about two-thirds of the crop grown in North Carolina and Kentucky. Total U.S. production has declined about 20 percent since 1975. Cigarettes make up about 90 percent of U.S. tobacco use. Per capita use in the United States peaked in 1963 at 4,345 cigarettes and has fallen steadily since then to 2,640 in 1992.

A new report by USDA's Economic Research Service, *U.S. Tobacco Statistics, 1935-92*, charts the Nation's tobacco production, consumption, imports, exports, and the ins and outs of various government programs dealing with tobacco production from the mid-1930's.

The United States leads in tobacco exports because U.S. leaf is considered the highest quality. Although U.S. leaf exports have fallen since the early 1960's, their value has increased about 170 percent. U.S. exports to Turkey, Spain, Italy, and Japan rose, but those to traditional European markets, including the Netherlands and Germany, fell.

Worldwide cigarette consumption is rising. To meet that increase, U.S. cigarette exports increased sixfold between the mid-1970's and 1992, allowing U.S. cigarette production to remain relatively high. Pacific Rim countries edged out Middle Eastern and European countries as the major destination of U.S. cigarette exports.

**U.S. cigarette exports, 1970-92**




Even though cigarette consumption is declining in the United States, U.S. consumers annually spend record amounts on tobacco products. Expenditures rose more than fourfold from 1970 to 1992. Prices of tobacco products rose two to three times faster than the consumer price index during the last decade.

The United States dominates imports because U.S. cigarette manufacturers require types of tobacco not grown in the United States, and they use cheaper foreign leaf as filler for cigarettes. Many producing and exporting countries, including Italy, China, Malawi, and Brazil, increased production more than 100 percent during 1970-92. The United States was the only major producer with reduced production. Imported cigarettes constitute less than 1 percent of U.S. cigarette consumption.

## To Order This Report...

The information presented here is excerpted from ***U.S. Tobacco Statistics, 1935-92,*** SB-869, by Laverne Creek, Tom Capehart, and Verner Grise. The cost is $15.00.

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