



United States
Department
of Agriculture

FTS-337-01
June 2009



A Report from the Economic Research Service

www.ers.usda.gov

Specialized U.S. Fruit and Tree Nut Farm Production Expenses

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Abstract

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Specialized fruit and tree nut farms represent a substantial segment of the U.S. fruit and tree nut industry. By nature of the commodities produced and the markets targeted, these specialized farms require substantial investments in production inputs. Using data from USDA's Agricultural Resource and Management Survey (ARMS), this report investigates the major expense components of specialized fruit and tree nut farms in the United States from 1998 to 2006. Based on 3-year averages, the analysis compares farm expenses by farm size and across regions. Total cash expenses were highest in the West where the highest concentration of specialized fruit and tree nut farms are located, including a majority of the largest and most highly specialized farm operations. Labor was the largest cash expense for fruit and tree nut farms, followed by fertilizer and other agricultural chemical inputs.

Keywords: Fruit, nuts, tree nuts, farms, costs, production expenses, value of production, cost of production, farm size, region, labor, fertilizer, fuel, interest payments

Acknowledgments

The authors extend their appreciation and thanks to USDA staff members Nora Brooks, Gary Lucier, and Janet Perry of the Economic Research Service (ERS); John Love of the World Agricultural Outlook Board; John Jenkins of the Farm Service Agency; and Karen Klonsky of the University of California-Davis and Jose Peña of Texas A&M University for their valuable comments and suggestions. They also gratefully acknowledge the support provided by Daniel Pick of ERS and the editorial and design efforts extended on their behalf by Angela Anderson.

Approved by USDA's
World Agricultural
Outlook Board

Defining Specialized Fruit and Tree Nut Farms

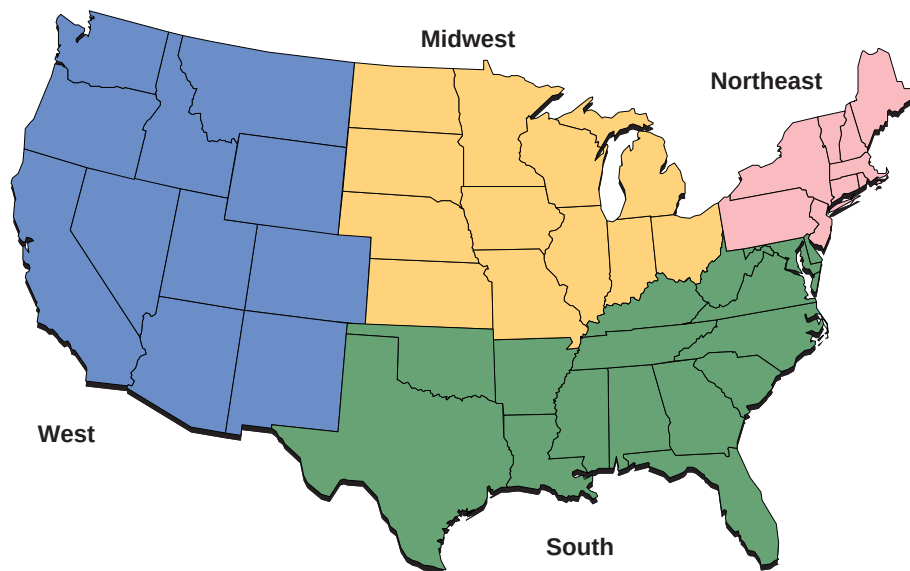
In the United States, about 5 percent of all farms rely, to some extent, on fruit and tree nut production for a portion of their income (2007 Census of Agriculture). Of these farms, the ones depending on fruit and tree nut sales for at least half the value of their farm production are referred to in this report as specialized fruit and tree nut farms. These specialized farms serve as the focus of a sectorwide trend analysis of fruit and tree nut production expenses in the United States.

Using annual data from USDA's Agricultural Resource and Management Survey (ARMS), this report investigates the major expense components of specialized fruit and tree nut farms in the United States from 1998 to 2006. Based on 3-year averages (1998-2000, 2001-03, and 2004-06), the analysis compares farm expenses by farm size and across regions. Due to sample size limitations, the regional groupings were adjusted from the four traditional geographic regions (Northeast, Midwest, South, and West) assigned by the U.S. Census Bureau (fig. 1). The Northeast and the Midwest were combined into a single region (North) to gain statistical significance, forming three major regions—North, South, and West.

ARMS classifies farms into four size groups based on the value of production: small (less than \$40,000 in production value), medium (\$40,000-\$249,000 in production value), large (\$250,000-\$999,999 in production value), and very large (\$1,000,000 or more in production value).

Figure 1

States included in each census region*



*Midwest and Northeast regions combined (North region) for this report to add statistical significance to the analysis.

Source: Prepared for ERS using data from U.S. Department of Commerce, U.S. Census Bureau, Geography Division, www.census.gov/geo/www/us_regdiv.pdf.

The Agricultural Resource Management Survey (ARMS)

The farm-level data for this article was derived from the USDA's Agricultural Resource Management Survey (ARMS) conducted annually. ARMS is the only national survey that provides information on a broad range of issues about agricultural resource use, production practices, farm costs and financial conditions, and the economic well-being of America's farm households—all collected in a representative sample. In addition to indepth analysis of individual sectors, such as fruit and tree nuts, the survey also allows comparisons among various farm sectors (Livezey and Ali).

The ARMS is an annual survey designed and conducted jointly by ERS and the National Agricultural Statistics Service (NASS). More information about the ARMS can be found at www.ers.usda.gov/Briefing/ARMS.

Specialized Fruit and Tree Nut Farm Becoming Fewer and Larger

Specialized fruit and tree nut farms make up the vast majority of all U.S. farms engaged in fruit and tree nut production and provide a major portion of total U.S. fruit and tree nut production. Of the average 76,498 farms that produced fruit and tree nuts between 2004 and 2006, 82 percent were specialized fruit and tree nut farms (table 1). These specialized farms rely heavily on their fruit and/or tree nut crops for their farm income, even though they may also be engaged in other forms of agricultural production. During 2004-06, more than 95 percent of the farm income for these specialized fruit and tree nut farms was generated from fruit and tree nut sales.

According to data derived from ARMS, the average number of specialized fruit and tree nut farms in the United States in 2004-06 (average of 62,959) declined by 20 percent from 1998-2000 (app. tables 1 and 3). Farm numbers declined across all three regions—North, South, and West. Small farms continue to dominate, representing more than half the average number of specialized fruit and tree nut farms during 2004-06 (app. table 7). These small specialized fruit and tree nut farms, however, are also becoming fewer, having declined by 35 percent from (average of 52,984) 1998-2000 to 2004-06 (average of 34,315). On the other hand, the number of medium, large, and very large farms rose during the same period, with very large farms showing the biggest gain, increasing 51 percent to an average 2,602 farms (app. tables 5 and 7).

The characteristics of these specialized fruit and tree nut farms over the last several years partially mirrors the general trend in U.S. fruit and tree nut farms reported in the census of agriculture. While the number of specialized fruit and tree nut farms declined between 1998-2000 and 2004-06, all U.S. farms growing tree fruit, vine fruit, berries, and tree nuts increased from 85,973 in 1997 to 112,690 in 2007. Farms with orchards increased 2 percent over the same period, while orchard acreage declined 6 percent to 5.04 million acres. Data from the 2007 Census of Agriculture also indicated that small, family operations continue to dominate all U.S. fruit and tree nut farms. These small farms, however, generate only about 5 percent of all fruit and tree nut sales. Most fruit and tree nut sales come from fruit and tree nut farms with at least \$50,000 in sales, with over 60 percent of the total sales coming from the largest of these farms—those with at least \$1 million in sales.

Table 1

Average farm expenses for all U.S. fruit and tree nut farms, by farm type, 2004-06

Item	Nonspecialized	Specialized	All
Number of farms	13,539	62,959	76,498
Average acres per farm	484	122	186
Harvested acres	169	67	85
Harvested fruit and tree nut acres	21	59	52
Share in fruit and tree nuts (percent)	12.4	88.4	61.5
Gross value of production (\$/farm)	362,413	218,978	244,363
		<i>Dollars per farm</i>	
Variable cash expenses	226,515	144,621	159,115
Livestock related ¹	22,011	1,309	4,973
Seed and plants	17,812	4,113	6,538
Fertilizer and chemicals	31,930	21,557	23,393
Labor	83,904	69,441	72,000
Fuels and oils	13,121	6,545	7,709
Repairs and maintenance	13,687	8,241	9,205
Machine-hire and custom work	10,169	9,839	9,897
Utilities	11,005	8,150	8,655
Other variable expenses ²	22,878	15,426	16,744
Fixed cash expenses	38,788	25,720	28,033
Real estate and property taxes	5,269	6,180	6,019
Interest	9,104	8,991	9,011
Insurance premiums	5,271	4,559	4,685
Rent and lease payments	19,144	5,991	8,319
Total cash expenses	265,303	170,342	187,148
Total noncash and imputed expenses	57,955	41,628	44,517
Depreciation	17,112	12,095	12,983
Labor, noncash benefits	704	488	526
Charge to operator and unpaid labor	30,692	20,978	22,697
Charge to management	9,446	8,067	8,311
Total economic (long-term) expenses	323,258	211,969	231,666
Selected financial ratios		<i>Percent</i>	
Cash expense ratio	76.50	75.69	75.89
Economic expense ratio	89.61	87.25	87.82

Note: Nonspecialized fruit and tree nut farms are defined as farms where fruit and tree nuts account for less than 50 percent of total farm production value.

¹ Includes expenses related to the production of farm animals, such as livestock purchases, feed, livestock leasing, medical supplies, veterinary, custom, pasturing, grazing, and bedding.

² Includes supplies, transportation, storage, general business expenses, and registration fees.

Source: ERS calculations based on USDA's Agricultural Resource Management Survey (ARMS).

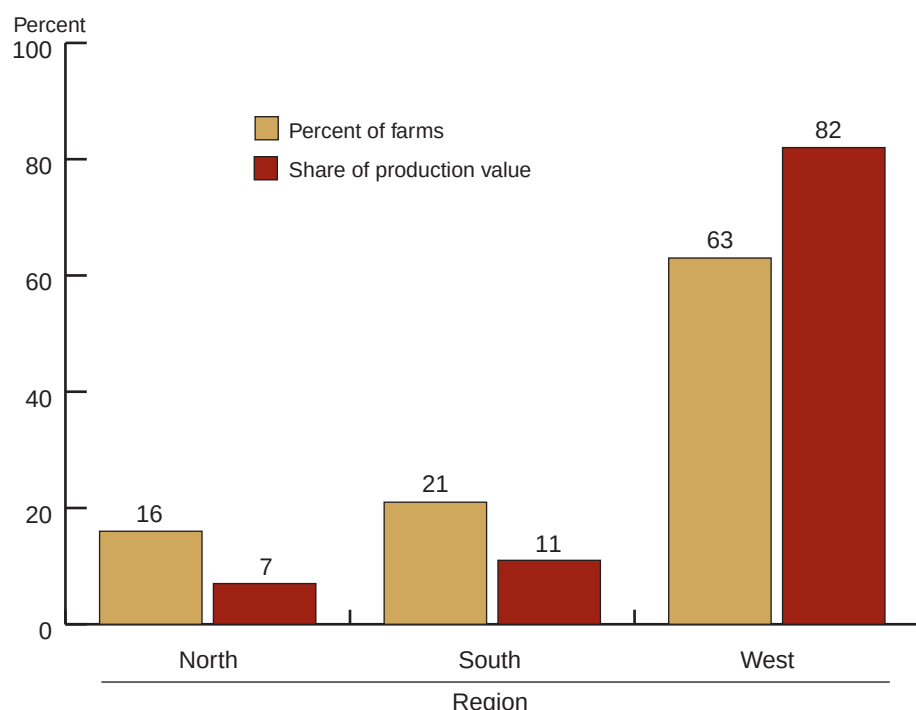
Farm Presence Largest in the West

The West has the highest concentration of specialized fruit and tree nut farms in the United States, averaging 63 percent of the total (39,590 farms) during 2004-06 (fig. 2 and app. table 3). The South had more than a third (13,371 farms) the number found in the West, holding a 21-percent share, while the North (consisting of farms from the Midwest and Northeast) had the fewest, with a 16-percent share. Specialized fruit and tree nut farms in the North generally had fewer acres per farm than either the U.S. average or that of the other two regions (app. table 3). Harvested fruit and tree nut acres per farm in the North averaged only about half the U.S. average, while those in the South and West were between 5 and 10 percent larger than all specialized fruit and tree nut farms.

Fruit and tree nut crops account for a larger percentage of harvested acres on specialized fruit and tree nut farms in all regions (app. table 4). On a per farm basis, fruit and tree nut harvested acres among specialized fruit and tree nut farms in the North averaged about 30 acres during 2004-06, or about 76 percent of their total harvested acres (app. table 3). In the South and West, harvested fruit and tree nut acres averaged slightly over 60 acres each and accounted for 88-90 percent of total harvested area per farm. While the share of fruit and tree nut acres to total harvested acres per farm are almost similar to that for the South and West, the West contributes a much greater portion of the U.S. fruit and tree nut production value because of the high concentration of specialized fruit and tree nut farms in the region (fig. 2). In 2004-06, specialized fruit and tree nut farms in the West accounted for 82 percent

Figure 2

Regional distribution of specialized fruit and tree nut farms, 2004-06



Source: ERS calculations based on USDA's Agricultural Resource Management Survey (ARMS).

of fruit and tree nut crop value, while those in the South accounted for 11 percent and those in the North for 7 percent.

Specialized fruit and tree nut farms are more heavily concentrated in the western United States. This region is comprised of 11 States, including California, Washington, and Oregon, which are among the top fruit-producing States (including tree nuts for California and Oregon). In 2007, these three States accounted for more than 60 percent of the country's fruit- and nut-bearing acreage, contributing to about three-quarters of the U.S. fruit and tree nut production value, based on statistics obtained from USDA's National Agricultural Statistics Service (NASS). California is the chief producer of fruit and tree nuts, with about half of the country's combined fruit- and nut-bearing acreage and nearly 60 percent of total fruit and tree nut crop value in 2007. California not only grows the bulk of the country's grapes (table, wine, and raisin-type grapes), strawberries, peaches, nectarines, avocados, kiwi-fruit, walnuts, and pistachios, but also serves as a major producer of apples, pears, plums, sweet cherries, blueberries, and raspberries. Based on NASS data, grapes and strawberries are among the highest valued fruit crops in the country—valued at over \$3 billion and almost \$2 billion annually from 2005 to 2007—representing more than a quarter of U.S. fruit and tree nut crop value. Virtually the entire U.S. almond crop, averaging \$2.3 billion annually and over 10 percent of the U.S. fruit and tree nut crop value during 2005-07, is also produced in California. Second only to Florida in citrus production, California is also the primary source of citrus fruit for the higher valued fresh fruit market. Florida's citrus crop may have been twice the volume of California's crop between 2005 and 2007, but the value of California's citrus crop, averaging \$1.1 billion annually, almost matched Florida's at \$1.5 billion.

Although Florida ranks second in fruit- and tree-nut-bearing acreage, a greater share of Washington's fruit and tree nut acreage produces crops sold to the higher valued fresh market, boosting their value. Washington ranks second to California in fruit and tree nut production value, followed by Florida. Washington accounted for about 10 percent of U.S. fruit- and tree-nut-bearing acreage in 2007, half of which produced apples. Washington is the largest apple-producing State, harvesting more than half of the U.S. apple crop. Over 75 percent of Washington's apple production during 2005-07 went to the fresh market. In terms of value, the fresh market accounted for over 95 percent of the more than \$1 billion in apple crop value in Washington during 2005-07. The State also ranked first in quantity of apples produced for the processing sector. Pears, sweet cherries, grapes, raspberries, and blueberries are also among Washington's contributions to U.S. fruit and tree nut production. Oregon is also a major producer of these commodities, ranking fourth in U.S. fruit and tree nut production value in 2007.

Very Large Farms Generate More Than Half of Fruit and Tree Nut Crop Value

The share of specialized fruit and tree nut sales to gross value of production per farm for each of the four class sizes (small, medium, large, and very large) were all over 96 percent. While small farms accounted for more than half of all specialized U.S. fruit and tree nut farms during 2004-06, larger farms generated a greater share of fruit and tree nut crop value (fig. 3). Only about 4 percent of specialized fruit and tree nut farms between 2004 and 2006 were classified as very large, but these very large farms provided 58 percent of the total production value of fruit and tree nuts. Small farms contributed just 3 percent of total fruit and tree nut production value. Between 2004 and 2006, medium and large farms made up a significant share of specialized fruit and tree nut farms (30 percent and 11 percent, respectively). Farms in these two size classes averaged 15 percent and 25 percent, respectively, of total fruit and tree nut production value.

Small farms also dominated specialized fruit and tree nut farm populations in each of the three major regions (North, South, and West) during 2004-06 (table 2). While small farm shares of specialized fruit and tree nut farms within regions were higher in the South (77 percent) and in the North (55 percent), the West still accounted for the largest number of small specialized fruit and tree nut farms during 2004-06. Between 2004 and 2006, the West housed more than half of the small specialized fruit and tree nut farms in the country and almost 70 percent of medium specialized fruit and tree nut farms. Large and very large farms are also highly concentrated in the West, accounting for over 80 percent of large and very large specialized farms during 2004-06.

Specialized fruit and tree nut farms in the West are very commodity specific, with 92 percent producing only one commodity (table 2). In the North and South, most of the specialized fruit and tree nut farms are more diversified. Twenty-four percent of the specialized fruit and tree nut farms in the South and 22 percent in the North produce two or more commodities.

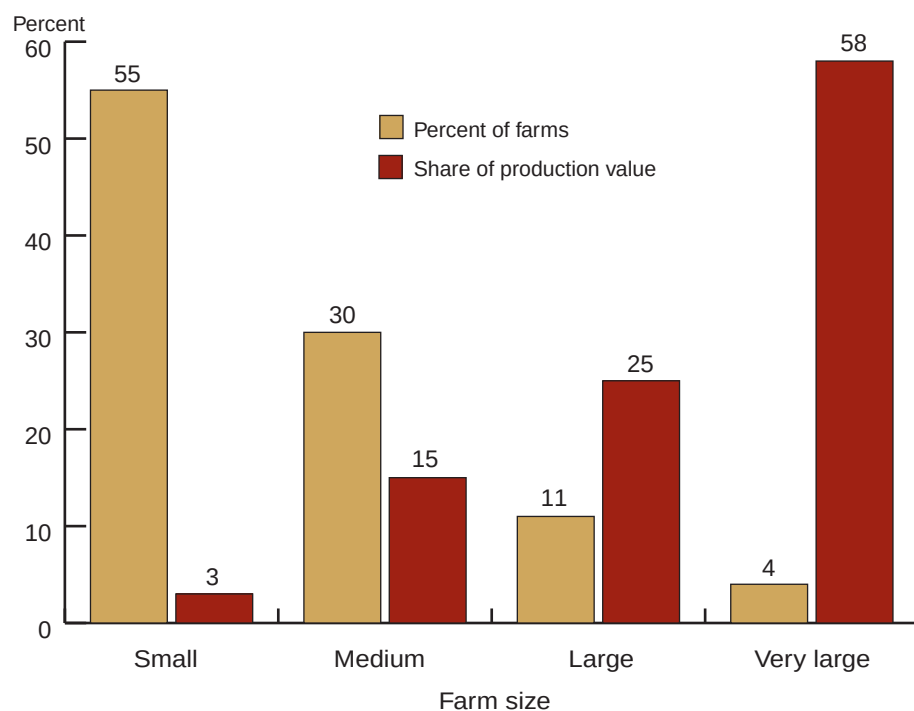
Table 2

Specialized fruit and tree nut farms, 2004-06

Item	United States	North	South	West
Percent of farms				
Number of commodities produced:				
One commodity	86.4	77.7	76.1	92.2
Two commodities	9.5	9.3	19.3	6.2
Three or more commodities	4.1	13.1	4.6	1.6
Farm size:				
Small	54.5	54.6	77.4	46.7
Medium	30.3	38.6	16.0	33.1
Large	11.0	5.2	4.9	14.6
Very large	4.1	1.5	1.7	5.6

Note: Farm size is measured by the production value of all commodities produced on a farm.
Source: ERS calculations based on USDA's Agricultural Resource Management Survey (ARMS).

Figure 3

Size distribution of specialized fruit and tree nut farms, 2004-2006

Note: Farm size is measured by the production value of all commodities produced on a farm.
Source: ERS calculations based on USDA's Agricultural Resource Management Survey (ARMS).

Specialized Fruit and Tree Nut Farm Expenses

Variable Expenses Account for the Bulk of Total Production Costs

Growers incur variable cash expenses for crop production inputs, such as labor, fertilizer and chemicals, seeds and plants, and fuels. These expenses tend to vary with acreage and output. On average, the annual variable cash expense across all specialized U.S. fruit and tree nut farms from 1998 to 2006 was \$114,066 per farm, or 83 percent of each farm's average total cash expenses (app. table 4). Annual variable expenses per farm rose 52 percent between 1998-2000 and 2004-06, led by increased outlays for fuels and oils, seeds and plants, labor, and fertilizers and other agricultural chemicals (app. tables 1 and 3). Average cash outlays for fuels and oils per farm more than doubled from 1998-2000 to 2004-06, and expenses for seeds and plants rose more than 80 percent. Labor and chemical input cost increases were also substantial, rising 59 percent and 42 percent, respectively.

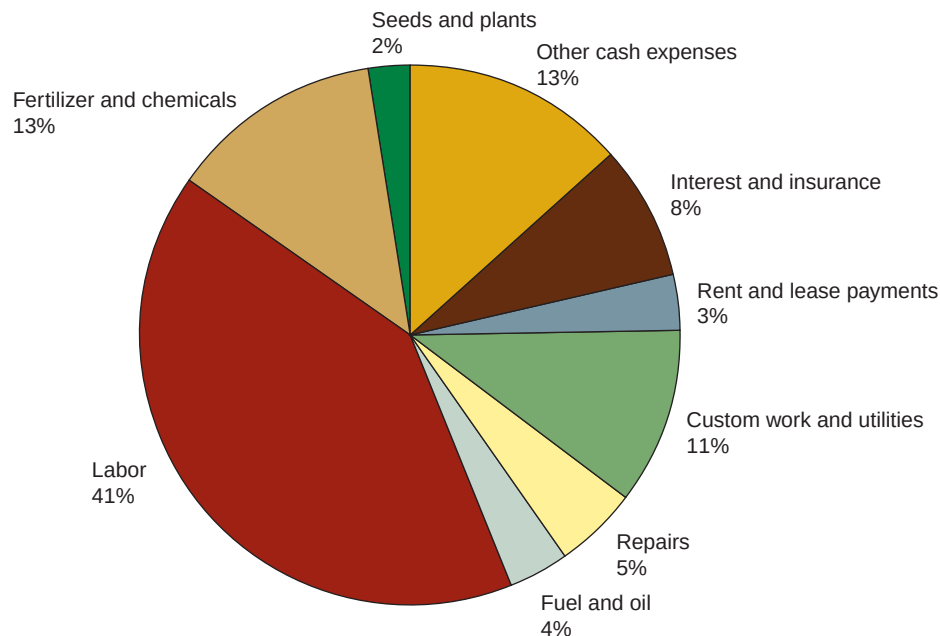
In addition to variable cash expenses, specialized fruit and tree nut farms also incur fixed cash expenses, such as real estate and property taxes, interest, insurance premiums, rent, and lease payments. Combined with average variable cash expenses, the total cash expense for these farms averaged \$170,342 per farm during 2004-06 (app. table 3). In comparison, nonspecialized fruit and tree nut farms incurred 56 percent higher average total cash expenses per farm during the same period because of the larger harvested crop acreage required to operate these farms (table 1). Acreage in fruit and tree nut production, however, amounted to 12 percent of total harvested acres per farm for these nonspecialized farms compared with 88 percent for the specialized farms. Total cash expenses for nonspecialized fruit and tree nut farms averaged \$265,303 per farm during 2004-06, with higher expenses for all variable expense items than those incurred by specialized fruit and tree nut farms, including more substantial livestock-related expenses.

Labor and Agricultural Chemicals Top Cash Expense List

As a critical input in fruit and tree nut production, labor is by far the biggest cash expense for specialized U.S. fruit and tree nut farms, accounting for 41 percent of total cash outlays per farm during 2004-06 (fig. 4). Labor's share of total cash outlays per farm rose with farm size—29 percent for small specialized fruit and nut farms, 33 percent for medium farms, and 42-44 percent for large and very large farms. Throughout the fruit and tree nut production cycle, farm labor is required to carry out the various field/orchard operations that, for most fruit and tree nuts, include grafting, transplanting (in the case of strawberries), thinning, pruning, irrigating, pest management, fertilization, and harvesting. Some farms also have onsite packing facilities, so some manual labor is also required to sort, pack, and grade fruit and nuts immediately after harvesting. With continued production demand in the U.S. fruit and tree nut industry, the industry often experiences shortages of agricultural labor. While mechanization may often be regarded as one option to

Figure 4

Cash expenses for specialized fruit and tree nut farms, by share, 2004-06



Note: Specialized fruit and tree nut farms are defined as farms where fruit and tree nuts account for at least 50 percent of total farm production value.
Source: ERS calculations based on USDA's Agricultural Resource Management Survey (ARMS).

relieve some of the demands for farm labor, it has not been widely adopted in the U.S. fruit and tree nut industry.

The fresh market is a very important niche for U.S. fruit growers. While about a third of all the fruit produced in the United States enters the fresh market, it represents more than half the value of U.S. fruit production. When selling to the fresh market, fruit growers must comply with stringent quality requirements, making these crops more costly to produce. For example, skilled hired labor, especially in harvesting and packing, is necessary to avoid the risk of fruit damage and to ensure that specific criteria for appearance are met to maintain or increase customer base. For those reasons, most fresh-market fruit are harvested by hand.

Generally, fruit are sorted and graded and those that do not meet fresh-market quality standards move to the processing sector. In some cases, however, like for cranberries, clingstone peaches, wine-type or raisin-type grapes, and most Florida citrus, the processing sector serves as the primary market. Quality requirements for fruit sold to processors are not as stringent as those for the fresh market; even so, most fruit is still harvested by hand. On the other hand, mechanical harvesting systems are used extensively for tree nuts, which are generally processed. Because many fruit and tree nut harvest seasons overlap, access to a reliable and affordable labor pool is vital to the U.S. fruit and tree nut industry.

Based on 2007 Census of Agriculture data, fruit and tree nut farms employed 23 percent of all the hired farmworkers in the United States and accounted for 16 percent of total wages for hired farm labor. Fruit and tree nut growers

have larger cash outlays for hired farmworkers than for custom work. More than 60 percent of fruit and tree nut farm wages were for hired workers.

Agricultural chemicals (including fertilizers) were the second biggest cash expense for specialized fruit and tree nut farms (not including organic farms), accounting for 13 percent of total cash expenses. This expense is followed by machine-hire and custom work (6 percent) and repairs and maintenance (5 percent). Unlike most vegetable and melon crops, where annual planting is required, fruit and tree nut farm expenses for seeds and transplants trail other farm cash outlay items. After an orchard is established, it generally takes about 3-4 years for the trees to reach bearing age, and a typical orchard's longevity extends 15-20 years after reaching full production.

Cash Expenses Are Highest in the West

Specialized fruit and tree nut farms in the West incurred the highest total cash outlays per farm during 2004-06 because this region has the highest concentration of specialized fruit and tree nut farms and the biggest representation of medium to very large farms for this type of farm operation. Total cash expenses of specialized fruit and tree nut farms in the West averaged \$220,145 per farm during 2004-06 (app. table 3), more than twice those for the South (\$87,258) and North (\$84,240). Total cash expenses were consistently lowest for specialized fruit and tree nut farms in the North during each of the three periods, likely because of smaller harvested acreage devoted to fruit and tree nuts in the region and smaller farm size, on average.

On a per acre basis, however, total specialized fruit and tree nut farm cash expenses were lowest in the South during both 1998-2000 and 2004-06. Total cash expenses in the South are spread across a larger average area per farm than in the North and West, driving down the region's per acre cost. Total specialized fruit and tree nut farm cash expenses in the South averaged \$578 per acre in 2004-06 compared with \$795 in the North and \$1,897 in the West. Specialized fruit and tree nut farms in the North, however, had the biggest gains in per acre total cash expenses between 1998-2000 and 2004-06, increasing by about 64 percent compared with 35 percent in the South and 34 percent in the West.

Increasing Cost of Manufactured Inputs

Manufactured, or energy-based, inputs represent over 20 percent of total cash expenses across all specialized fruit and nut farms in the United States. Inputs, such as fertilizer and other agricultural chemicals, fuels and oils, and utilities, all fall under this input category. Between 2004 and 2006, manufactured input costs incurred by specialized fruit and tree nut farms averaged \$36,252 per farm, up 46 percent from those of 1998-2000 (table 3). More than half of these expenses consisted of fertilizer and other agricultural chemicals, such as pesticides, insecticides, and herbicides. Cost increases, however, were highest for fuels and oils, with the average cost per farm more than two times higher. Much higher farm expenditure gains for fuels and oils are largely an offshoot of higher unit costs for petroleum-based fuels, such as diesel and gasoline, as reflected by a 103-percentage-point increase in the average index of prices paid by farmers for fuels between 1998-2000 and 2004-06 (USDA, NASS, *Agricultural Prices Summary*, 2005 and 2007).

Cash outlays for all agricultural chemicals also increased by 42 percent, and utility expenses rose by 21 percent.

Comparing expenses across the four farm size classes, chemical input expenses as a share of total cash costs per farm were relatively consistent for medium, large, and very large farms at 13 percent during 2004-06 (app. table 7). The share for small farms (those with less than \$40,000 in production value) was slightly lower, at 10 percent. On a per farm basis, however, small specialized fruit and tree nut farms experienced a 5-percent increase in their average cash outlays for agricultural chemicals from 1998-2000 to 2004-06, while those for medium, large, and very large farms declined (table 3).

As with most of the U.S. agricultural sector, higher prices for oil and natural gas over the past few years have translated to higher costs to fruit and tree nut growers for manufactured inputs. For instance, because natural gas is used to convert atmospheric nitrogen to synthetic fertilizer, the higher natural gas prices in recent years, coinciding with increased global demand for fertilizer, have driven up nitrogen fertilizer prices in the United States. Except for the small but growing organic fruit and nut production sector in the country, U.S. fruit and tree nut growers, along with vegetable growers, are some of

Table 3

Manufactured inputs on specialized fruit and tree nut farms ¹

Period and farm size	Fuels and oils	Fertilizer and chemicals	Utilities ²	Total
<i>Dollars per farm</i>				
1998-2000:				
Small	517	2,110	917	3,544
Medium	2,889	13,527	6,322	22,738
Large	14,311	57,622	24,032	95,966
Very large	45,025	291,215	131,985	468,226
All	3,048	15,138	6,727	24,910
2004-06:				
Small	1,102	2,215	1,408	4,725
Medium	4,373	12,216	5,402	21,990
Large	15,408	53,292	17,800	86,500
Very large	70,588	260,432	91,455	422,474
All	6,545	21,557	8,150	36,252
<i>Percent change</i>				
Change:				
Small	113	5	54	33
Medium	51	-10	-15	-3
Large	8	-8	-26	-10
Very large	57	-11	-31	-10
All	115	42	21	46

Note: Specialized fruit and tree nut farms are defined as farms where fruit and tree nuts account for more than 50 percent of total farm production value. Farm size is measured by the production value of all commodities produced on a farm.

¹ See the text for farm size definitions.

² Due to data-handling limitations, includes other utilities in addition to electricity.

Source: ERS calculations based on USDA's Agricultural Resource Management Survey (ARMS).

the heaviest users of agricultural chemical inputs in farm production. With declining overall fruit and tree nut bearing acreage over the years, grower practices, such as the adoption of improved varieties, soil fertilization, pest management, and orchard-floor management, have contributed to higher yields and achieving the quality attributes that today's consumers demand.

Specialized fruit and tree nut farms in the West had 25 percent higher manufactured input expenses per farm during 2004-06 than the national average (app. table 3). Of these specialized farms, 92 percent produce only one commodity. Sixty percent of all specialized fruit and tree nut farms are located in the West, including most of the large and very large specialized U.S. fruit and tree nut farms (over 80 percent each class).

Specialized fruit and tree nut farms in the North and South are much more diversified, whereby nearly a quarter of the farms in each of these regions produces more than one agricultural commodity, including livestock that requires no direct use of fertilizer and herbicides. Other farms that grow more than one crop could be growing nonfruit/nut crops, such as cover and forage crops, that would also not require intensive use of fertilizers and other chemical inputs.

Fixed Cash Expenses Rise

Farms also incur fixed cash expenses, such as real estate and property taxes, interest payments, insurance premiums, and rent and lease payments. On a per farm basis for specialty fruit and tree nut farms, fixed cash expenses contributed to 15 percent of their total cash outlays during 2004-06. The average fixed cash outlays of specialty U.S. fruit and tree nut farms have gone up, increasing 30 percent from 1998-2000 to 2004-06 compared with an increase of 52 percent for variable costs (app. tables 1 and 3). Fixed cash outlays rose for all expenditure items except for interest payments, which declined 6 percent. The national average trend for fixed cash outlays of specialized fruit and tree nut farms, however, does not depict the trend seen across the different farm size classes and across regions. Average fixed cash outlays rose only among small farms from 1998-2000 to 2004-06 and for large farms from 2001-03 to 2004-06. On a regional scale, average fixed cash outlays over the period 1998-2000 to 2004-06 rose 24 percent in the West and 54 percent in the North, but fell 3 percent in the South.

Interest payments represent the largest fixed cash expenditure item for specialized fruit and tree nut farms. Interest expenses cover the cost of carrying both real estate and nonreal estate debt. Averaging \$8,991 per farm during 2004-06, interest payments for specialty fruit and tree nut farms amounted to about 5 percent of total cash expenses for these farms and were higher than the average interest expenses incurred by all U.S. farms and ranches (\$4,654 per farm). Similar to the vegetable and melon industry, much of the U.S. fruit and tree nut industry is concentrated in urban fringe and coastal areas, which raises land rent and interest on real estate debt. Interest expenses for specialized fruit and tree nut farms generally decline as farm size increases, with 8 percent of small farm cash expenses consisting of interest payments versus 4 percent for very large farms. This discrepancy suggests that large farms may have the capacity to self-finance some portion, if not all, of their operations.

Financial Viability of Specialized Fruit and Tree Nut Farms

Two financial measures were applied during this analysis to see how well specialized fruit and tree nut farms in the United States control their production expenses for the immediate and long-term future. A farm may be financially viable in the short run, such as for a year, if it is able to cover its variable expenses, or it may survive for more than a year if its revenues can cover total cash expenses. Some options for farms would be to tap cash reserves, borrow against assets, or use off-farm income to pay their total cash outlays. In the long run, however, a farm may be deemed financially viable only when it is able to cover economic costs—that is total cash expenses plus an allowance for depreciation and imputed returns to management, land, and operator and unpaid labor.

One of the indicators used to measure the financial strength of specialized U.S. fruit and tree nut farms is the cash expense ratio. This ratio measures how much a farm operation must spend for production inputs and overhead items for each dollar of income it produces. Cash expense ratio is calculated by dividing total cash expenses by gross cash farm income. Based on this measure, specialized fruit and tree nut farms were found to be financially secure in the short run, spending \$76 on inputs and overhead items for every \$100 of income produced during 2004-06. The cash expense ratio for specialized fruit and tree nut farms is the same as what was spent by nonspecialized fruit and tree nut farms (\$77), as reported by 2004-06 ARMS data, and by all U.S. farms and ranches (\$77) (<http://www.ers.usda.gov/Briefing/ARMS/>).

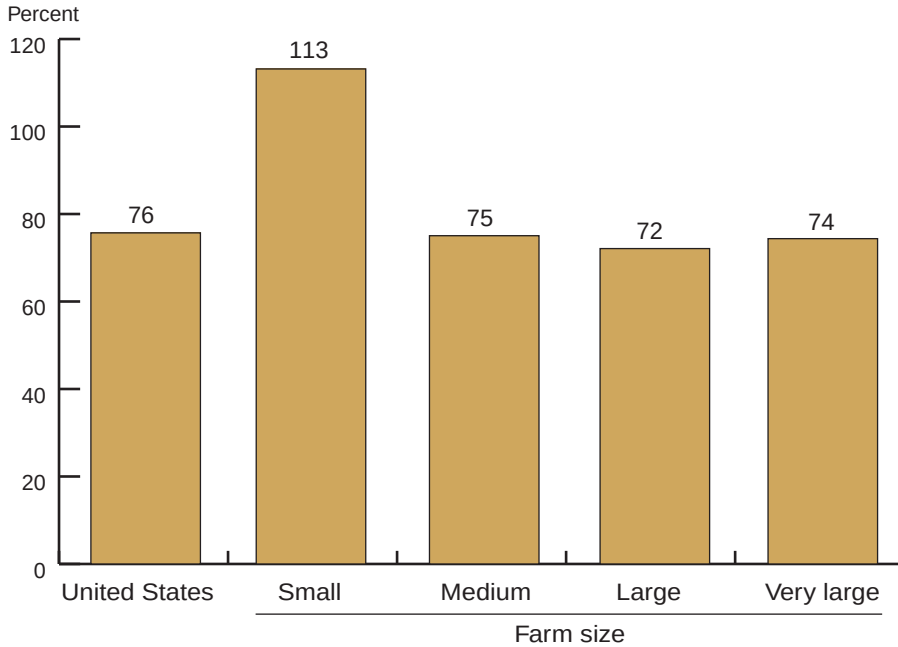
Figure 5 shows the amount spent on production inputs and overhead items for every \$100 that a farm earns differs very little between very large farms (\$74), large farms (\$72), and medium farms (\$75). By contrast, small farms spent more than they earned, incurring \$113 in cash expenses for every \$100 of income, which suggests that small specialized fruit and tree nut farms are subsidized by off-farm income. Specialized fruit and tree nut farms in the South are the most heavily represented by small farms (77 percent of farms in the region), which may explain why the region had the highest cash expense ratio across regions.

The second measure of financial viability is the economic cost ratio, which measures how much a farm must spend over the long run for all costs (cash, noncash, and imputed expenses). This ratio is calculated by dividing total economic costs by gross farm income. Using this ratio, the analysis showed that specialized fruit and tree nut farms in the United States incurred \$87 in total economic costs for every \$100 of income they earned during 2004-06. The economic cost ratio was 3 percent lower than what was estimated for nonspecialized fruit and tree nut farms (\$90) and 11 percent below those for all U.S. farms and ranches (\$98), based on 2004-06 ARMS data. It is, however, very close to the economic cost ratio for specialized vegetable and melon farms, which was estimated at \$88 for every \$100 of gross farm income (Ali and Lucier, 2008). Small specialized fruit and tree nut farms were the most vulnerable to longrun unprofitability. Based on the economic cost ratio calculations across farm size classifications, small farms were the only class producing income that was not sufficient to cover total economic costs—spending \$120 in the long run for every \$100 of income. Specialized fruit and tree nut farms in the West—the region with the highest concentra-

tion of large and very large farms—had the lowest economic cost ratio (fig. 6). The highest economic cost ratio was in the North and, although the region had fewer small farms than in the South, it had the least representation by large and very large specialized fruit and tree nut farms.

Figure 5

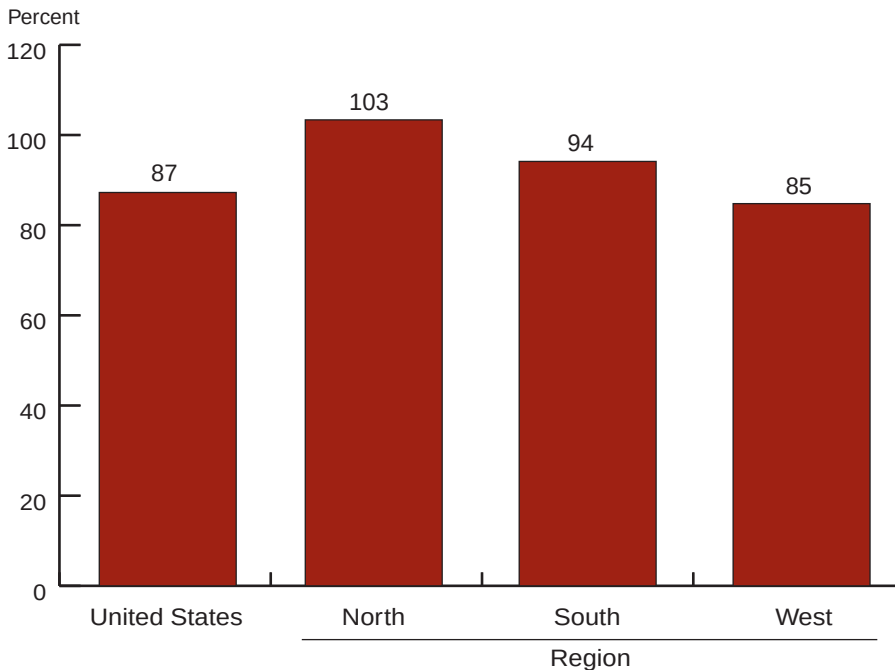
**Cash expense ratio for specialized fruit and tree nut farms,
by farm size, 2004-06**



Source: ERS calculations based on USDA's Agricultural Resource Management Survey (ARMS).

Figure 6

**Economic cost ratio for specialized fruit and tree nut farms,
by region, 2004-06**



Source: ERS calculations based on USDA's Agricultural Resource Management Survey (ARMS).

What Could Alter Future Agricultural Production Expense Profiles?

Currently, several issues could affect which fruit and tree nut crops are produced and which production methods are used. These issues include immigration, labor, environmental concerns (particularly those relating to agricultural chemical use and climate change), and diet and health. As a consequence of these concerns, modifications in farming operations could change the production expense profile of specialized fruit and tree nut farms. For example, if the labor available to fruit and tree nut growers were further constrained, fresh-market production of some crops might be reduced, some production might shift to processing, or there could be more incentive to move toward mechanization. Adopting any of these changes could reduce overall labor requirements. Labor is the leading expense item for fruit and tree nut growers and is most intensively used in fresh-market production. New research may show an interest in advancing mechanization technology for specialty crops through the Specialty Crop Research Initiative, established in the 2008 Farm Bill. If mechanization becomes more prevalent in fruit and tree nut production, not just in harvesting, but also in the performance of other orchard or vineyard tasks, some of labor's share of production expenses would be shifted to fuel costs, and capital expenditures would increase.

Should environmental regulations force reductions in use of chemical fertilizers and pesticide, there likely will be more widespread adoption of organic farming methods or increased use of integrated pest management systems to control weeds, prevent disease spread, and enhance soil nutrients. Both of these shifts in production methods will also alter the share of chemical inputs in the expense mix.

Horticultural crops, such as fruit, are more sensitive to climate change than are grains and oilseeds (Backlund, Janetos, and Schimel, 2008). Geographic shifts in production resulting from poor crop adaptation to warming/drying climates pose a threat to growers. Another risk associated with climate change is reduced water supplies from mountain snowpack and premature snowmelt runoff, specifically in the western United States where most fruit and tree nuts are produced. Should these conditions occur more often and in combination with environmental regulations that restrict water use, growers will face higher crop irrigation costs and/or be forced to reduce orchard acreage.

Growing concern about the obesity problem in our country has strengthened the emphasis on increasing public awareness of the benefits of following a healthy diet. If consumers were to strictly abide by nutritional recommendations that encourage five to nine servings of fruit and vegetables per day, the United States would need to expand production and/or increase imports. For the fruit and tree nut sector, increased productivity may be achieved through acreage expansion, high-density plantings, and/or use of new varieties that offer better yield performance or adaptability to certain geographic and/or climatic conditions. A move toward increased acreage could further boost land costs, while higher density planting reflects higher fixed capital costs because, unlike annual crops, tree fruits, nut trees, and vineyards remain productive for a number of years.

Conclusions

Specialized fruit and tree nut farms—those who rely on fruit and tree nut sales for at least half the value of their farm production—comprise a vast majority of all the farms producing these crops in the United States. Because of fruit and tree nut farms' heavy dependence on labor and energy-based inputs to produce their crops, these specialized farms face growing pressure from rising production costs, primarily associated with recent labor shortages and rising fuel prices. Between 1998-2000 and 2004-06, before the current national and global economic crisis, average cash outlays for fuels and oils per farm more than doubled, while cost increases for labor and chemical inputs rose by 59 and 42 percent, respectively. Despite steep increases in input costs, however, specialized U.S. fruit and tree nut farms were able to remain financially viable, more so than all U.S. farms and ranches, in general. This is especially true for the larger specialized fruit and tree nut farms (those with \$40,000 or higher in production value like medium, large, and very large farms) that have a greater presence in the West.

While there is no clear indication as to when the economic situation will turn around, market fluctuations on a complex mix of economic (e.g., fuel prices, housing market, value of the U.S. dollar, commodity prices) and natural (weather) factors will continue to challenge fruit and tree nut growers, likely inducing structural and technological changes in their business approaches that will help them maintain their competitive position. Fuel prices have begun to climb again after dropping from the record highs this past summer, and, when the economic situation improves, a rebound in the housing market will bring growth again in construction jobs, likely pulling workers back to construction and away from agriculture.

Access to farm credit may be a challenge due to current uncertainties in the credit market. Export growth has been instrumental in the success of the U.S. fruit and tree nut industry over the last several years, providing a key market outlet for growers and boosting grower prices. With other world economies also softening, demand for U.S. exports may be dampened by the current strengthening of the U.S. dollar. Low demand from exports could divert products to the domestic market and, with current consumer confidence down, may also mean lower commodity prices paid to growers, increasing the financial challenges faced by specialized fruit and tree nut farms. More than half of these specialized farms are small operations—found to be most vulnerable to shortrun and longrun financial losses. One may note, however, that the business of growing fruit and tree nut crops is quite different from that of most other agricultural crops. Because fruit and tree nut orchards, along with vineyards, remain commercially productive for many years, production decisions are more likely based not just on 1 year's financial performance, but on expectations over several years. Fruit and tree nut growers are, therefore, more likely to weather short-term economic hardships by tapping into potential profitability associated with increasing fruit and tree nut demand.

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Glossary

Cash expenses: variable cash expenses plus fixed cash expenses.

Cash-expense ratio: measures how much a farm operation must spend for inputs and overhead items for each dollar of income it produces. Ratio = $(\text{Total cash expenses} / \text{Gross cash farm income}) \times 100$.

Economic cost ratio: measures how much a farm operation must spend over the long run for all cost items (cash, noncash, and imputed expense). Ratio = $(\text{Total economic (long-term) expenses} / \text{Gross farm income}) \times 100$.

Economic (long-term) expenses: cash expenses plus noncash and imputed expenses, such as depreciation, cash labor benefits, charges to operators and other unpaid labor, and charges to management.

Farm size: based on the value of production from all commodities produced on a farm. Small farms (production value less than \$40,000), medium farms (\$40,000-\$249,999), large farms (\$250,000-\$999,999), and very large farms (\$1,000,000 or more).

Fixed cash expenses: expenses that do not vary directly with output, but remain constant. Examples include real estate and property taxes, interest, insurance payments, mortgage, rent, and lease payments.

Gross cash farm income: income from livestock, crops (including net Commodity Credit Corporation loans), Government payments (including commodity marketing loan gains and certificate-exchange gains), custom work and machine hire, fee income from crops and livestock removed under production contracts, land rental fees, and other farm-related income.

Gross farm income: gross cash income plus net change in value of crop, livestock, feed, fertilizer inventory, and accounts receivable, value of farm products consumed or used on-farm, and gross imputed rental value of farm operator dwelling.

Imputed expenses: charges for unpaid labor and management. Examples include work done by the farm operator, partners, and family members in conjunction with the production of commodities where there is no payment for services. Though unpaid labor does not generally receive a wage, it does have an economic cost. Compensation for unpaid labor and management is based on the opportunity cost of off-farm work or the return available in the next best alternative use of laborers' and managers' time and skills.

Noncash expenses: may include charges on depreciable assets and noncash benefits provided to labor, such as housing. Depreciation is the charge sufficient to maintain production capacity of machinery, equipment, buildings, and purchased breeding livestock. Depreciation may be regarded as a discretionary expense in any particular year. It may be deferred when income is low, but ultimately must be paid to maintain the capital stock so that over the long term, the operation remains in business.

Nonspecialized fruit and tree nut farms: farms where fruit and tree nuts account for less than 50 percent of total farm production value.

Production value: total value from all products produced on a farm, excluding the value of intermediate products, such as corn fed to livestock.

Regions: defined by the U.S. Census Bureau as North (Northeast and Midwest combined), South, and West.

Specialized fruit and tree nut farms: farms where fruit and tree nuts account for at least 50 percent of total farm production value.

Variable cash expenses: expenses that change in proportion to the activity of the farm. In agriculture, these expenses are primarily the money spent for inputs used during the production process, including seed and plants, fertilizer, chemicals, machine hire and custom work, fuels and oils, repairs, hired labor, utilities, livestock-related expenses (such as livestock purchases, feed, veterinary care, grazing fees, and bedding), supplies, transportation, storage, and general business expenses.

Appendix Tables

Average regional farm expenses for specialized fruit and tree nut farms

Appendix table 1: 1998-2000

Appendix table 2: 2001-03

Appendix table 3: 2004-06

Appendix tables 4: 1998-2006

Average farm expenses for specialized fruit and tree nut farms, by farm size

Appendix table 5: 1998-2000

Appendix table 6: 2001-03

Appendix table 7: 2004-06

Appendix table 8: 1998-2006

Average regional farm expenses for specialized fruit and tree nut farms, 1998-2000

Item	United States	Region		
		North	South	West
Number of farms	78,710	12,902	21,286	44,522
Average acres per farm	120	102	143	113
Harvested acres	59	34	52	70
Harvested fruit and nut acres	54	28	48	65
Share in fruit and nuts (percent)	91.7	82.7	90.9	93.3
Gross value of production (\$/farm)	130,062	63,081	70,363	178,014
<i>Dollars per farm</i>				
Variable cash expenses	95,016	40,431	51,218	131,773
Livestock related ¹	749	455	721	848
Seed and plants	2,237	838	1,310	3,086
Fertilizer and chemicals	15,138	6,510	11,858	19,206
Labor	43,771	19,759	17,083	63,490
Fuels and oils	3,048	1,649	1,463	4,211
Repairs and maintenance	6,243	3,489	3,266	8,465
Machine-hire and custom work	9,369	1,148	10,952	10,995
Utilities	6,727	1,538	1,201	10,872
Other variable expenses ²	7,732	5,045	3,364	10,599
Fixed cash expenses	19,780	9,037	9,891	27,622
Real estate and property taxes	4,321	2,345	2,610	5,712
Interest	8,936	3,169	4,738	12,614
Insurance premiums	3,226	2,017	1,689	4,311
Rent and lease payments	3,298	1,506	855	4,985
Total cash expenses	114,796	49,469	61,109	159,395
Total noncash and imputed expenses	33,340	24,202	22,099	41,363
Depreciation	14,301	8,512	10,068	18,002
Labor, noncash benefits	605	363	57	937
Charge to operator and unpaid labor	11,656	12,406	8,568	12,915
Charge to management	6,778	2,921	3,406	9,508
Total economic (long-term) expenses	148,136	73,671	83,208	200,758
<i>Percent</i>				
Selected financial ratios				
Cash expense ratio	81.40	85.34	84.96	80.45
Economic expense ratio	98.42	112.53	108.79	95.35

Note: Specialized fruit and tree nut farms are defined as farms where fruit and tree nuts account for more than 50 percent of total farm production value. Farm size is measured by the production value of all commodities produced on a farm.

¹ Includes expenses related to the production of farm animals, such as livestock purchases, feed, livestock leasing, medical supplies, veterinary, custom, pasturing, grazing, and bedding.

² Includes supplies, transportation, storage, general business expenses, and registration fees.

Source: ERS calculations based on USDA's Agricultural Resource Management Survey (ARMS).

Average regional farm expenses for specialized fruit and tree nut farms, 2001-03

Item	United States	Region		
		North	South	West
Number of farms	65,960	8,801	13,124	44,036
Average acres per farm	110	118	123	104
Harvested acres	65	48	65	68
Harvested fruit and nut acres	59	41	60	62
Share in fruit and nuts (percent)	91.0	84.0	93.3	91.4
Gross value of production (\$/farm)	178,294	103,168	92,158	218,980
<i>Dollars per farm</i>				
Variable cash expenses	107,634	58,901	66,817	129,539
Livestock related ¹	691	523	—	857
Seed and plants	2,444	1,779	2,323	2,613
Fertilizer and chemicals	15,298	9,395	13,875	16,901
Labor	51,999	26,844	—	64,812
Fuels and oils	3,778	3,088	—	4,282
Repairs and maintenance	5,679	6,138	3,226	6,318
Machine-hire and custom work	9,527	1,159	13,012	—
Utilities	7,126	2,113	1,407	9,832
Other variable expenses ²	11,093	7,863	4,304	13,761
Fixed cash expenses	22,909	13,621	9,091	28,884
Real estate and property taxes	4,937	4,269	2,916	5,673
Interest	9,599	3,920	3,221	12,635
Insurance premiums	3,369	3,126	—	3,785
Rent and lease payments	5,004	2,306	817	6,791
Total cash expenses	130,544	72,522	75,908	158,422
Total noncash and imputed expenses	37,553	33,011	21,414	43,270
Depreciation	13,753	10,243	6,567	16,596
Labor, noncash benefits	464	601	229	506
Charge to operator and unpaid labor	15,638	17,530	10,550	16,776
Charge to management	7,698	4,637	4,068	9,391
Total economic (long-term) expenses	168,097	105,533	97,322	201,693
<i>Percent</i>				
Selected financial ratios				
Cash expense ratio	76.84	72.32	82.46	76.54
Economic expense ratio	91.65	93.98	98.90	90.46

Note: Specialized fruit and tree nut farms are defined as farms where fruit and tree nuts account for more than 50 percent of total farm production value. Farm size is measured by the production value of all commodities produced on a farm.

— = Insufficient data for legal disclosure or standard error is greater than 75 percent of the estimates.

¹ Includes expenses related to the production of farm animals, such as livestock purchases, feed, livestock leasing, medical supplies, veterinary, custom, pasturing, grazing, and bedding.

² Includes supplies, transportation, storage, general business expenses, and registration fees.

Source: ERS calculations based on USDA's Agricultural Resource Management Survey (ARMS).

Average regional farm expenses for specialized fruit and tree nut farms, 2004-06

Item	United States	Region		
		North	South	West
Number of farms	62,959	9,998	13,371	39,590
Average acres per farm	122	106	151	116
Harvested acres	67	39	70	72
Harvested fruit and nut acres	59	30	62	65
Share in fruit and nuts (percent)	88.4	76.4	87.9	90.2
Gross value of production (\$/farm)	218,978	97,013	118,642	283,664
<i>Dollars per farm</i>				
Variable cash expenses	144,621	70,359	77,674	185,985
Livestock related ¹	1,309	379	815	1,712
Seed and plants	4,113	2,681	2,246	5,105
Fertilizer and chemicals	21,557	9,671	18,296	25,660
Labor	69,441	33,258	27,474	92,751
Fuels and oils	6,545	4,647	3,720	7,978
Repairs and maintenance	8,241	5,619	4,125	10,294
Machine-hire and custom work	9,839	1,706	14,596	10,286
Utilities	8,150	2,479	1,734	11,749
Other variable expenses ²	15,426	9,918	4,668	20,449
Fixed cash expenses	25,720	13,881	9,584	34,160
Real estate and property taxes	6,180	4,146	3,196	7,702
Interest	8,991	4,464	2,122	12,454
Insurance premiums	4,559	3,638	2,188	5,592
Rent and lease payments	5,991	1,634	2,078	8,413
Total cash expenses	170,342	84,240	87,258	220,145
Total noncash and imputed expenses	41,628	43,012	25,266	46,804
Depreciation	12,095	11,237	5,319	14,601
Labor, noncash benefits	488	373	156	629
Charge to operator and unpaid labor	20,978	27,160	16,533	20,917
Charge to management	8,067	4,243	3,258	10,657
Total economic (long-term) expenses	211,969	127,252	112,524	266,949
<i>Percent</i>				
Selected financial ratios				
Cash expense ratio	75.69	71.5	80.20	75.55
Economic expense ratio	87.25	103.36	94.14	84.78

Note: Specialized fruit and tree nut farms are defined as farms where fruit and tree nuts account for more than 50 percent of total farm production value. Farm size is measured by the production value of all commodities produced on a farm.

¹ Includes expenses related to the production of farm animals, such as livestock purchases, feed, livestock leasing, medical supplies, veterinary, custom, pasturing, grazing, and bedding.

² Includes supplies, transportation, storage, general business expenses, and registration fees.

Source: ERS calculations based on USDA's Agricultural Resource Management Survey (ARMS).

Average regional farm expenses for specialized fruit and tree nut farms, 1998-2006

Item	United States	Region		
		North	South	West
Number of farms	69,210	10,567	15,927	42,716
Average acres per farm	117	108	140	111
Harvested acres	63	40	61	70
Harvested fruit and nut acres	57	32	55	64
Share in fruit and nuts (percent)	90.4	81.2	90.6	91.7
Gross value of production (\$/farm)	172,346	84,912	89,859	224,731
<i>Dollars per farm</i>				
Variable cash expenses	114,066	54,997	62,906	147,754
Livestock related ¹	901	450	617	1,118
Seed and plants	2,872	1,681	1,850	3,548
Fertilizer and chemicals	17,135	8,308	14,213	20,408
Labor	54,169	25,983	22,406	72,984
Fuels and oils	4,340	2,994	2,393	5,400
Repairs and maintenance	6,670	4,896	3,496	8,292
Machine-hire and custom work	9,562	1,327	12,538	10,489
Utilities	7,285	1,994	1,407	10,786
Other variable expenses ²	11,133	7,364	3,987	14,729
Fixed cash expenses	22,576	11,838	9,585	30,075
Real estate and property taxes	5,080	3,447	2,858	6,313
Interest	9,163	3,786	3,589	12,572
Insurance premiums	3,675	2,836	1,951	4,526
Rent and lease payments	4,656	1,769	1,187	6,665
Total cash expenses	136,642	66,835	72,491	177,829
Total noncash and imputed expenses	37,192	32,580	22,797	43,699
Depreciation	13,458	9,852	7,777	16,468
Labor, noncash benefits	525	432	132	694
Charge to operator and unpaid labor	15,748	18,482	11,342	16,714
Charge to management	7,461	3,814	3,547	9,823
Total economic (long-term) expenses	173,833	99,415	95,289	221,528
<i>Percent</i>				
Selected financial ratios				
Cash expense ratio	77.78	75.45	82.59	77.32
Economic expense ratio	91.98	102.86	100.78	89.67

Note: Specialized fruit and tree nut farms are defined as farms where fruit and tree nuts account for more than 50 percent of total farm production value. Farm size is measured by the production value of all commodities produced on a farm.

¹ Includes expenses related to the production of farm animals, such as livestock purchases, feed, livestock leasing, medical supplies, veterinary, custom, pasturing, grazing, and bedding.

² Includes supplies, transportation, storage, general business expenses, and registration fees.

Source: ERS calculations based on USDA's Agricultural Resource Management Survey (ARMS).

Average farm expenses for specialized fruit and tree nut farms, by farm size, 1998-2000

Item	Farm size			
	Small Less than \$40,000	Medium \$40,000- \$249,999	Large \$250,000- \$999,999	Very large \$1,000,000 or more
Number of farms	52,984	18,263	5,739	1,724
Average acres per farm	35	147	425	1,409
Harvested acres	13	59	249	875
Harvested fruit and nut acres	12	55	219	816
Share in fruit and nuts (percent)	92.4	93.8	88.2	93.2
Gross value of production (\$/farm)	9,550	98,842	481,246	2,995,814
<i>Dollars per farm</i>				
Variable cash expenses	11,597	89,869	384,963	1,748,283
Livestock related ¹	101	689	3,132	13,389
Seed and plants	302	2,977	8,662	32,519
Fertilizer and chemicals	2,110	13,527	57,622	291,215
Labor	3,680	34,699	197,542	860,233
Fuels and oils	517	2,889	14,311	45,025
Repairs and maintenance	1,611	6,795	22,432	88,888
Machine-hire and custom work	1,114	15,923	28,751	129,164
Utilities	917	6,322	24,032	131,985
Other variable expenses ²	1,245	6,050	28,479	155,866
Fixed cash expenses	4,342	17,316	81,033	316,492
Real estate and property taxes	1,388	4,898	15,273	51,894
Interest	2,050	6,887	36,367	150,968
Insurance premiums	741	3,687	15,300	34,534
Rent and lease payments	163	1,845	14,093	79,097
Total cash expenses	15,939	107,186	465,996	2,064,776
Total noncash and imputed expenses	11,953	36,103	121,840	366,811
Depreciation	2,213	13,750	68,030	212,822
Labor, noncash benefits	39	831	4,069	4,068
Charge to operator and unpaid labor	8,966	15,337	21,854	21,401
Charge to management	736	6,185	27,887	128,520
Total economic (long-term) expenses	27,892	143,289	587,836	2,431,587
<i>Percent</i>				
Selected financial ratios				
Cash expense ratio	116.41	85.88	81.08	74.20
Economic expense ratio	140.06	107.09	98.68	85.03

Note: Specialized fruit and tree nut farms are defined as farms where fruit and tree nuts account for more than 50 percent of total farm production value. Farm size is measured by the production value of all commodities produced on a farm.

¹ Includes expenses related to the production of farm animals, such as livestock purchases, feed, livestock leasing, medical supplies, veterinary, custom, pasturing, grazing, and bedding.

² Includes supplies, transportation, storage, general business expenses, and registration fees.

Source: ERS calculations based on USDA's Agricultural Resource Management Survey (ARMS).

Average farm expenses for specialized fruit and tree nut farms, by farm size, 2001-03

Item	Farm size			
	Small Less than \$40,000	Medium \$40,000- \$249,999	Large \$250,000- \$999,999	Very large \$1,000,000 or more
Number of farms	39,898	17,748	6,223	2,092
Average acres per farm	30	100	252	1,291
Harvested acres	14	67	159	714
Harvested fruit and nut acres	13	63	144	638
Share in fruit and nuts (percent)	91.1	93.7	90.5	89.3
Gross value of production (\$/farm)	10,972	110,459	487,849	3,024,347
	<i>Dollars per farm</i>			
Variable cash expenses	13,415	82,806	279,059	1,605,392
Livestock related ¹	170	652	2,159	6,590
Seed and plants	682	1,548	5,490	34,596
Fertilizer and chemicals	1,869	13,090	41,683	211,668
Labor	4,822	32,516	142,119	849,030
Fuels and oils	616	3,466	11,556	43,599
Repairs and maintenance	1,119	5,807	17,194	57,307
Machine-hire and custom work	1,442	7,250	23,487	—
Utilities	1,492	9,143	15,153	73,587
Other variable expenses ²	1,204	9,333	20,217	187,484
Fixed cash expenses	5,175	20,046	60,480	273,681
Real estate and property taxes	2,184	4,339	12,762	39,242
Interest	2,093	9,269	23,503	—
Insurance premiums	818	3,741	10,008	29,112
Rent and lease payments	80	2,698	14,206	91,107
Total cash expenses	18,591	102,852	339,539	1,879,073
Total noncash and imputed expenses	13,366	37,508	85,757	355,863
Depreciation	2,115	10,305	35,434	200,498
Labor, noncash benefits	80	344	1,983	4,284
Charge to operator and unpaid labor	10,417	20,947	26,815	36,935
Charge to management	754	5,913	21,525	114,145
Total economic (long-term) expenses	31,956	140,360	425,296	2,234,935
	<i>Percent</i>			
Selected financial ratios				
Cash expense ratio	119.58	76.30	74.89	73.18
Economic expense ratio	125.14	100.99	86.24	84.34

Note: Specialized fruit and tree nut farms are defined as farms where fruit and tree nuts account for more than 50 percent of total farm production value. Farm size is measured by the production value of all commodities produced on a farm.

— = Insufficient data for legal disclosure or standard error is greater than 75 percent of the estimates.

¹ Includes expenses related to the production of farm animals, such as livestock purchases, feed, livestock leasing, medical supplies, veterinary, custom, pasturing, grazing, and bedding.

² Includes supplies, transportation, storage, general business expenses, and registration fees.

Source: ERS calculations based on USDA's Agricultural Resource Management Survey (ARMS).

Average farm expenses for specialized fruit and tree nut farms, by farm size, 2004-06

Item	Farm size			
	Small Less than \$40,000	Medium \$40,000- \$249,999	Large \$250,000- \$999,999	Very large \$1,000,000 or more
Number of farms	34,315	19,095	6,947	2,602
Average acres per farm	42	89	270	1,026
Harvested acres	12	47	165	667
Harvested fruit and nut acres	11	40	149	593
Share in fruit and nuts (percent)	89.2	84.2	90.4	89
Gross value of production (\$/farm)	10,095	104,694	500,737	3,059,645
	<i>Dollars per farm</i>			
Variable cash expenses	16,721	77,643	337,487	1,807,684
Livestock related ¹	—	799	3,368	13,962
Seed and plants	498	2,508	6,505	57,183
Fertilizer and chemicals	2,215	12,216	53,292	260,432
Labor	6,329	31,362	166,421	922,122
Fuels and oils	1,102	4,373	15,408	70,588
Repairs and maintenance	1,902	6,284	20,120	74,479
Machine-hire and custom work	967	6,135	21,049	124,081
Utilities	1,408	5,402	17,800	91,455
Other variable expenses ²	2,083	8,566	33,523	193,384
Fixed cash expenses	5,240	16,460	60,633	270,516
Real estate and property taxes	2,237	4,986	12,447	50,205
Interest	1,728	6,105	24,806	83,723
Insurance premiums	1,085	3,761	11,571	37,489
Rent and lease payments	191	1,608	11,810	99,099
Total cash expenses	21,961	94,103	398,120	2,078,200
Total noncash and imputed expenses	17,988	41,404	86,700	234,663
Depreciation	2,015	8,945	33,666	110,544
Labor, noncash benefits	124	304	—	4,947
Charge to operator and unpaid labor	14,917	26,504	30,185	35,765
Charge to management	933	5,651	21,728	83,408
Total economic (long-term) expenses	39,949	135,507	484,820	2,312,864
	<i>Percent</i>			
Selected financial ratios				
Cash expense ratio	113.16	75.04	72.10	74.37
Economic expense ratio	120.10	98.86	84.12	79.90

Note: Specialized fruit and tree nut farms are defined as farms where fruit and tree nuts account for more than 50 percent of total farm production value. Farm size is measured by the production value of all commodities produced on a farm.

— = Insufficient data for legal disclosure or standard error is greater than 75 percent of the estimates.

¹ Includes expenses related to the production of farm animals, such as livestock purchases, feed, livestock leasing, medical supplies, veterinary, custom, pasturing, grazing, and bedding.

² Includes supplies, transportation, storage, general business expenses, and registration fees.

Source: ERS calculations based on USDA's Agricultural Resource Management Survey (ARMS).

Average farm expenses for specialized fruit and tree nut farms, by farm size, 1998-2006

Item	Farm size			
	Small Less than \$40,000	Medium \$40,000- \$249,999	Large \$250,000- \$999,999	Very large \$1,000,000 or more
Number of farms	42,399	18,368	6,303	2,139
Average acres per farm	35	112	311	1,215
Harvested acres	13	57	189	738
Harvested fruit and nut acres	12	52	169	668
Share in fruit and nuts (percent)	91.1	91	89.5	90.5
Gross value of production (\$/farm)	10,143	104,611	490,580	3,030,997
<i>Dollars per farm</i>				
Variable cash expenses	13,550	83,358	332,667	1,725,798
Livestock related ¹	154	715	2,899	11,405
Seed and plants	474	2,354	6,825	43,197
Fertilizer and chemicals	2,062	12,932	50,786	252,806
Labor	4,753	32,840	167,868	881,677
Fuels and oils	706	3,589	13,807	54,926
Repairs and maintenance	1,535	6,299	19,859	72,752
Machine-hire and custom work	1,177	9,738	24,189	131,134
Utilities	1,230	6,911	18,820	96,517
Other variable expenses ²	1,458	7,979	27,613	181,384
Fixed cash expenses	4,846	17,899	66,774	283,896
Real estate and property taxes	1,867	4,748	13,408	47,085
Interest	1,976	7,383	27,886	111,723
Insurance premiums	858	3,730	12,188	33,965
Rent and lease payments	145	2,038	13,292	91,122
Total cash expenses	18,395	101,256	399,442	2,009,694
Total noncash and imputed expenses	14,024	38,392	97,055	309,658
Depreciation	2,128	10,975	44,678	167,333
Labor, noncash benefits	75	491	2,299	4,495
Charge to operator and unpaid labor	11,026	21,013	26,547	32,288
Charge to management	795	5,912	23,531	105,542
Total economic (long-term) expenses	32,420	139,649	496,497	2,319,352
<i>Percent</i>				
Selected financial ratios				
Cash expense ratio	116.31	78.96	75.87	73.96
Economic expense ratio	128.25	102.23	89.49	82.67

Note: Specialized fruit and tree nut farms are defined as farms where fruit and tree nuts account for more than 50 percent of total farm production value. Farm size is measured by the production value of all commodities produced on a farm.

¹ Includes expenses related to the production of farm animals, such as livestock purchases, feed, livestock leasing, medical supplies, veterinary, custom, pasturing, grazing, and bedding.

² Includes supplies, transportation, storage, general business expenses, and registration fees.

Source: ERS calculations based on USDA's Agricultural Resource Management Survey (ARMS).