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Structural and Financial Characteristics of U.S. Farms

2004 Family Farm Report

David E. Banker and James M. MacDonald, editors



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Abstract

This report presents comprehensive information on family and nonfamily farms and important trends in farming, operator household income, farm performance, and contracting. Family farms and nonfamily farms vary widely in size and other characteristics, ranging from very small retirement and residential/lifestyle farms to establishments with sales in the millions of dollars. Most farms are family farms, or farm operations organized as proprietorships, partnerships, or family corporations. Even the largest farms tend to be family farms. Large family farms account for a small share of farms but a large and growing share of farm sales and are often organized as family corporations. Small family farms account for most of the farms in the U.S. but produce a modest share of farm output. Average farm household income has been at or above the average for all U.S. households in recent years, with farm households receiving most of their income from off-farm sources. Over the past 40 years, the growth in contract-governed production has been slow and steady, and now covers well over two-thirds of the value of U.S. production.

Keywords: Agricultural Resource Management Survey (ARMS), family farms, farm businesses, farm financial performance, farm operator household income, farm operators, farm structure, farm typology, women farm operators, spouses of farm operators, small farms, efficiency, contracting.

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Summary

Farms in the U.S. are extraordinarily diverse, ranging from very small retirement and residential/lifestyle farms to establishments with sales in the millions of dollars. Farming continues to be a distinctive industry in part because most production, even among very large farms, is carried out on family-operated farms whose operators often balance farm and off-farm employment and investment decisions. The organization of farming affects the efficiency and competitiveness of the farm sector, the well-being of farm households, the design and impact of public policies, and the nature of rural areas.

Agricultural policy analyses require an accurate source of basic information on how farming in the United States is organized. Analysts need to know how many farms there are, and of what sizes; the degree to which farms specialize in certain commodity combinations; the importance of families in farm operation and land ownership; the commercial methods that farmers are using to obtain inputs and sell farm products; and the sources of income received by farm households. This report provides current information and explores trends in the organization of farming.

Most farms in the U.S. are family farms (97 percent in 2001). Family farms are defined as farm operations organized as proprietorships, partnerships, or family corporations that are not run by hired managers. Even the largest farms tend to be family farms. For example, 86 percent of the farms with sales of \$1 million or more in 2001 were family farms. Large family farms are often organized as family corporations, and these account for a growing share of farm sales. The share of farms and sales accounted for by nonfamily corporations is small and has been relatively stable since 1978.

Small family farms (sales less than \$250,000) accounted for 90 percent of the farms in the U.S. but produced a modest share (28 percent) of farm output in 2001. Large (sales of \$250,000 to \$499,999) and very large family farms (sales of \$500,000 or more) accounted for only 7 percent of farms but 58 percent of the value of production in 2001. Nonfamily farms accounted for another 3 percent of farms and 14 percent of the value of production.

Small farms made higher proportionate contributions to the production of specific commodities, including oats, tobacco, hay, wheat, soybeans, corn and beef cattle. Small farms also held about 68 percent of all farm assets, including 60 percent of the land owned by farms. As custodians of the bulk of farm assets—including land—small farms have a large role in natural resource and environmental policy.

Census of agriculture data show that the number of large farms (sales of \$250,000 or more after adjusting for price changes) increased from 5 percent of all farms in 1987 to 8 percent of all farms in 1997. The share of sales attributed to large farms also increased significantly, from 51 percent in 1982 to 72 percent in 1997. The largest share increases occurred in farms with sales of \$1 million or more. These farms accounted for about 21 percent of agricultural sales in 1997, compared with about 12 percent in 1982.

Farm program payments go to different types of farmers, depending on the program. In 2001, three-fourths of commodity-related payments went to high-sales small farms (sales of \$100,000 to \$250,000), large family farms, and very large family farms. In contrast, over 50 percent of payments from the Conservation Reserve and Wetlands Reserve Programs went to retirement and residential/lifestyle farms.

In general, farm households are not a low-income group. Farm household income has been at or above the average for all U.S. households in recent years but varies substantially across households. Household income averaged \$64,500 for farm operators in 2001, 11 percent higher than the average for all U.S. households. Operators of residential/lifestyle farms, large family farms, and very large family farms had average incomes well above the average for all U.S. households. Operators in the limited-resource, retirement, and low-sales groups had average incomes that were below the national average.

Farm households received most of their income (91 percent) from off-farm sources. The importance of off-farm income varies widely among farm operator households. Residential/lifestyle farms account for nearly half of all U.S. farms, and they dominate average income measures because of their number and high income from off-farm work. At the other extreme, another major group, very large family farms, specializes in farm activities and receives little or no income from off-farm employment.

Contracts have governed much of the production and marketing of some commodities—like broilers and processing vegetables—since the 1950s. Over the past 40 years, the overall growth in contract-governed production has been slow and steady, reaching 36 percent of all agricultural production in 2001. However, rapid changes in market organization can and do occur for individual commodities. Contracts covered two-thirds of hog production in 2001, up from one-third just 5 years before. Virtually nonexistent in tobacco marketing in 1999, contracts covered half of production in 2001.

While the overall number of farms dropped by 8 percent from 1978 to 1997, the number of farms operated primarily by women rose from 5 percent of all farms in 1978 to 9 percent in 1997. Nearly half of that increase was due to growth in animal specialty farms and general livestock farms. Once primarily focused on beef cattle, women farmers have diversified in the last 20 years to specialize in other kinds of livestock such as horses, aquaculture, and fur-bearing animals.

The report relies extensively on data from the Agricultural Resource Management Survey (ARMS), its predecessor—the Farm Costs and Returns Survey, and the census of agriculture. The ARMS collects financial and operational data on U.S. farm businesses and information about farm operators and their households. The ARMS is designed and conducted each year by the Economic Research Service (ERS) and the National Agricultural Statistics Service (NASS), both agencies of the U.S. Department of Agriculture.

Structural and Financial Characteristics of U.S. Farms

Introduction

Robert A. Hoppe and David E. Banker

U.S. farms vary widely in size and other characteristics, ranging from very small retirement and residential farms to establishments with sales in the millions of dollars. The *2004 Family Farm Report* presents comprehensive data on the Nation's diverse family (and nonfamily) farms. It also examines important trends currently affecting family farms.

As in recent years, the Agricultural Resource Management Survey (ARMS)—an annual sample survey—is the main source of data in the *Family Farm Report*. The ARMS is designed and conducted each year by the Economic Research Service (ERS) and the National Agricultural Statistics Service (NASS), both agencies of the U.S. Department of Agriculture. Data from the various censuses of agriculture are also used. The census is particularly useful in following trends over long periods of time. For more information, see Appendix I, “Sources of Data.”

This report uses the farm typology developed by the Economic Research Service (ERS) to examine farm structure in the United States (see box, “Farm Typology Group Definitions”). A farm classification system is necessary because farms are diverse. Farms differ in their goals, strategies to meet these goals, the use and control of their resources, and the economic results of their farm and off-farm activities. The farm typology categorizes farms into more homogeneous groups—based primarily on annual sales of the farms and the major occupation of their operators—than classifications based on sales volume alone.

Classifying Diverse Farms

The ERS typology groups reflect operators' expectations from farming, position in the life cycle, and dependence on agriculture. Using more homogeneous categories based on a few key characteristics can help decision-makers better target policy measures, including those that are designed to support income, stabilize commodity supplies, and protect natural resources.

The typology uses the definition of “small farm” developed by the National Commission on Small Farms, which was instituted in 1997 by the Secretary of Agriculture to examine issues facing small farms. The Commission used \$250,000 in gross sales as its cutoff between small and large farms in its report, *A Time to Act* (U.S. Dept. Agr., Nat'l. Comm. on Small Farms, 1998), released in January 1998. The Commission—after much deliberation—set the cutoff high enough to include farm families of relatively modest income who may need or want to improve their net farm income.

Farm Typology Group Definitions

Small Family Farms (sales less than \$250,000)

Limited-resource farms. Small farms with sales less than \$100,000, farm assets less than \$150,000, and total operator household income* less than \$20,000. Operators may report any major occupation except hired manager.

Retirement farms. Small farms whose operators report they are retired.**

Residential/lifestyle farms. Small farms whose operators report a major occupation other than farming.**

Farming-occupation farms. Small family farms whose operators report farming as their major occupation.**

Low-sales farms. Sales less than \$100,000.

High-sales farms. Sales between \$100,000 and \$249,999.

Other Family Farms

Large family farms. Sales between \$250,000 and \$499,999.

Very large family farms. Sales of \$500,000 or more.

Nonfamily farms

Nonfamily farms. Farms organized as nonfamily corporations or cooperatives, as well as farms operated by hired managers.

*See Appendix II, "Measuring Farm Operator Household Income."

**Excludes limited-resource farms whose operators report this occupation.

The farm typology focuses on the "family farm," defined here as any farm organized as a sole proprietorship, partnership, or family corporation. According to 2001 ARMS data, about 97 percent of U.S. farms are family farms. Family farms exclude farms organized as nonfamily corporations or cooperatives, as well as farms with hired managers. Family farms are closely held (legally controlled) by their operator and the operator's household.¹ The operator is defined as the person who makes the day-to-day decisions on the farm; only one individual can be defined as the operator of a given farm (see Appendix I, "Sources of Data").

Other definitions of the family farm exist (see Appendix III, "Defining Family Farms"). These definitions are generally more restrictive than the one used in the farm typology, however. Some definitions exclude farms based on the amount of hired labor or total labor, the share of labor provided by the family, contracting arrangements, or tenure, which tend to eliminate larger farms. Excluding such farms would make sense only if the

¹The terms "household" and "family" are used interchangeably in this report, although the two terms are technically slightly different. For more information, see Appendix I, "Sources of Data."

focus is smaller family farms. Other definitions include only farms where the operator's main occupation is farming or where the farm provides at least half-time employment, which would tend to exclude smaller farms. The advantage of the ERS typology is that it is inclusive, but allows one to focus on various groups of large and small farms when necessary.

Farm Typology Groups

The first group identified by the typology is **limited-resource farms**², or family farms with gross sales less than \$100,000, farm assets less than \$150,000, and household income (see Appendix II, “Measuring Farm Operator Household Income”) less than \$20,000. Identifying limited-resource farms is important, because policymakers have developed special programs to serve farms in that category.

Unlike farmers in the other groups of small farms, limited-resource farmers are not restricted to one major occupation. Limited-resource farmers may report farming, a nonfarm occupation, or retirement as their major occupation. The limited-resource group identifies farmers with low sales, income, and assets, regardless of their major occupation.

The remaining small family farms are classified into one of three groups based on the major occupation of the operator—the occupation at which he or she spends more than 50 percent of his or her work time.

- **Retirement farms.** Small farms whose operators report they are retired. The operators may have had either a farm or nonfarm major occupation before retirement. However, they still are sufficiently engaged in farming to produce at least \$1,000 of farm products, the minimum necessary for an establishment to be classified as a farm according to USDA's official definition.
- **Residential/lifestyle farms.** Small farms whose operators report they have a major occupation other than farming. Some operators in this group may view their farms as a way to enjoy a farm lifestyle. For others, the farm provides a residence and may supplement their off-farm income. Some may hope to eventually farm full-time.
- **Farming-occupation farms.** Small farms whose operators report farming as their major occupation. Although the operator spends most of his or her time farming, the household may receive substantial income from off-farm work by other household members and from part-time off-farm work by the operator. Larger and smaller farms in this group differ in their characteristics, so this group is further divided into two subgroups based on gross sales:
 - **Low-sales farms.** Farming-occupation farms with sales less than \$100,000.
 - **High-sales farms.** Farming-occupation farms with sales between \$100,000 and \$249,999.

Three additional groups of farms were added to the typology to ensure that it covers all farms. **Large** family farms have sales between \$250,000 and \$499,999, and **very large family farms** have sales of \$500,000 or more. Finally, the **nonfamily farm** group includes farms organized as nonfamily

² In 2004, the current limited-resource farm definition was replaced with a new definition based on low household income persisting for 2 years and low gross sales of agricultural products. The household income data necessary for this definition were collected for the first time in the 2003 ARMS.

corporations or cooperatives and farms with hired managers. Operators of large and very large family farms may report farming, a nonfarm occupation, or retirement as their major occupation. Operators of nonfamily farms may also be hired managers.

Topics Covered by This Report

The remaining chapters in this report present comprehensive data on family and nonfamily farms, and information on important selected trends in family farms.

Chapter 1: Large and Small Farms: Trends and Characteristics. This chapter presents basic information on the structure of U.S. farms, using the ERS farm typology to illustrate how output, assets, and government payments are distributed across different farm types. Even though a wide variety of small farms continue to operate, production is shifting to large farms.

Chapter 2: Farm Household Income, Farm Structure, and Off-Farm Work. Off-farm income accounts for a growing share of farm household income. This chapter summarizes how different types of farm households include off-farm income among their income generating activities and outlines possible sources of growth in off-farm income among U.S. farms.

Chapter 3: Characteristics of Top-Performing Farms. Although large farms account for growing shares of farm output, and although small farms report poor financial performance on average, some small farms appear to be viable small-scale commercial enterprises. This chapter summarizes the range of financial performance measures among different farm types, and identifies the factors associated with high-performing farms.

Chapter 4: Farm Size, Farm Performance, and Off-Farm Work. One reason why large farms, on average, realize better financial returns than small farms is that farming technology allows them to realize lower costs through economies of scale. Scale economies may become less relevant, however, when the farm household is treated as an entity that combines farm output and off-farm work. This chapter examines the extent of scale economies and technical inefficiency on farms and farm households in the 10 major corn/soybean-producing States.

Chapter 5: Agricultural Use of Production and Marketing Contracts. Important changes are occurring in how farm products are sold, with a shift toward greater use of contracts. The use of contracts is associated with farm size (large farms use contracts much more than other farms), and can expand rapidly to cover additional commodities, as it has with hogs and tobacco in recent years.

Chapter 6: Women Farmers in Transition. From 1978 to 1997, the number of women-operated farms increased by 58 percent while overall numbers declined by 8 percent. Once primarily focused on beef cattle, women farmers have diversified in the last 20 years to specialize in horses, aquaculture, and fur-bearing animals. This chapter reports on trends in and characteristics of farms operated by women.

Large and Small Farms: Trends and Characteristics

Robert A. Hoppe and Penni Korb

The number of large farms has grown in recent decades, accompanied by increasingly concentrated agricultural production. Nevertheless, agriculture is not very concentrated compared with other industries. Despite the increase in large farms, small farms still account for over 90 percent of all farms and 68 percent of farm assets—but only 28 percent of production. High-sales small farms, large family farms, and very large family farms receive 75 percent of the payments from commodity programs. Retirement and residential/lifestyle farms, in contrast, receive about half of the payments from the Conservation Reserve and Wetlands Reserve Programs.

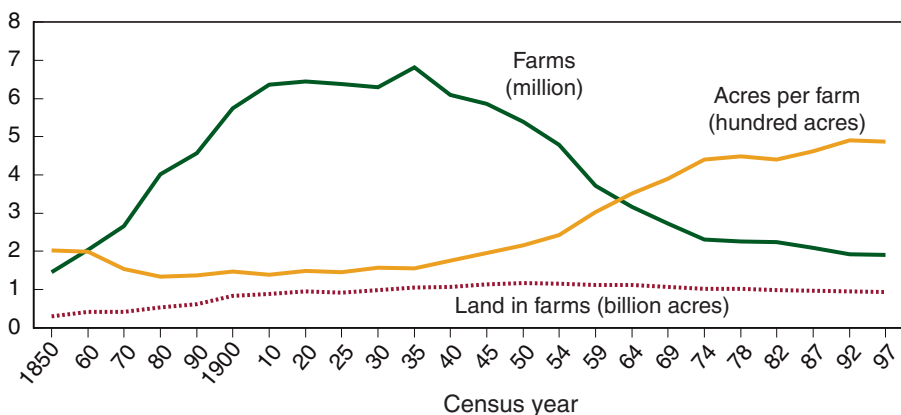
The number of U.S. farms fell dramatically after peaking at 6.8 million in 1935, with most of the decline occurring during the 1940s, 1950s, and 1960s (fig. 1-1). Falling farm numbers during this period reflect growing productivity in agriculture and increased nonfarm employment opportunities (Hoppe, 1994). Growing productivity led to excess capacity in agriculture, farm consolidation, and farm operators leaving farming to work in the nonfarm economy. The availability of nonfarm employment opportunities after the Great Depression also meant that young people growing up on farms had alternatives to farming (Gale, 1992).

The decline in farm numbers continues, but at a slower rate since 1974. By 1997, about 1.9 million farms remained. Because the amount of farmland did not decrease as much as the number of farms, the remaining farms have more acreage, on average. Some of the change in farm numbers reflects the

Figure 1-1

Farms, land in farms, and average acres per farm, 1850-1997

Most of the decline in farms occurred between 1935 and 1974



Source: USDA, Economic Research Service, compiled from census of agriculture data.

nine changes made to the farm definition since 1850. The current farm definition—any place normally selling at least \$1,000 of farm products in a given year—has been in use since the 1974 Census of Agriculture (See Appendix IV, “Defining and Counting Farms”).

The overall change in farm numbers masks different trends for large and small farms. This chapter traces the change in farm numbers by farm size and examines the characteristics of current U.S. farms. We use two major sources of data: various years of the census of agriculture and the 2001 Agricultural Resource Management Survey (ARMS). The census of agriculture is useful in tracking changes in the number and size of farms over time, but it is conducted at 5-year intervals, and the most recent data available for this report were from the 1997 Census of Agriculture. The ARMS provides more current information, since it is conducted annually. The ARMS also provides the detailed information necessary to understand current farm structure.

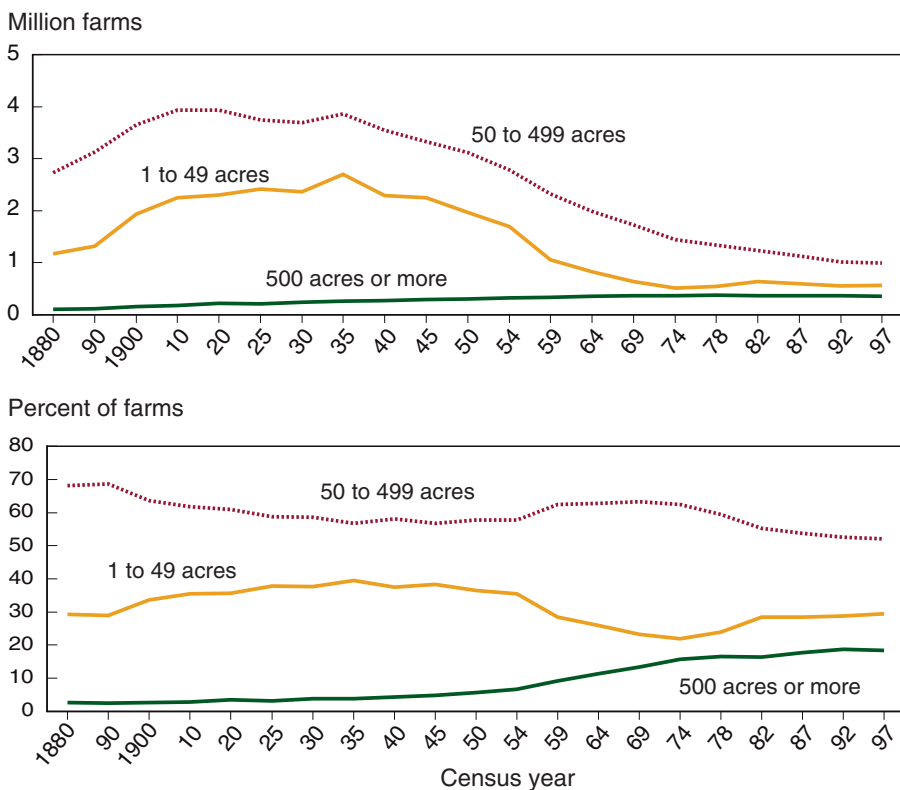
Trends Differ by Farm Size

The trend in the number of farms differs by acreage. The number of farms with at least 500 acres increased steadily from 1880 through the 1960s, before stabilizing at 350,000 to 370,000 farms (fig. 1-2). Farms with 1 to 49 acres declined from their peak of 2.7 million in 1935 to about half a million in 1974. After 1974, these farms have numbered between 540,000 and

Figure 1-2

Distribution of farms by acreage class, 1880-1997

The share of farms with 500 acres or more increased from 4 percent in 1935 to 18 percent in 1997



Source: USDA, Economic Research Service, compiled from census of agriculture data.

640,000. In contrast, the number of farms with 50-499 acres declined continuously from 3.9 million in 1935 to about 1 million farms in 1997. As a result of these changes, farms with fewer than 50 acres and farms with more than 500 acres have both increased their share of total farms since 1974, while the share of midsize farms has declined.

Acres or Sales?

Over long periods of time, acres are generally used to indicate farm size. Estimates of the number of farms and land in farms are available back to the 1850 Census of Agriculture, and the distribution of farms by acreage class is available back to 1880.

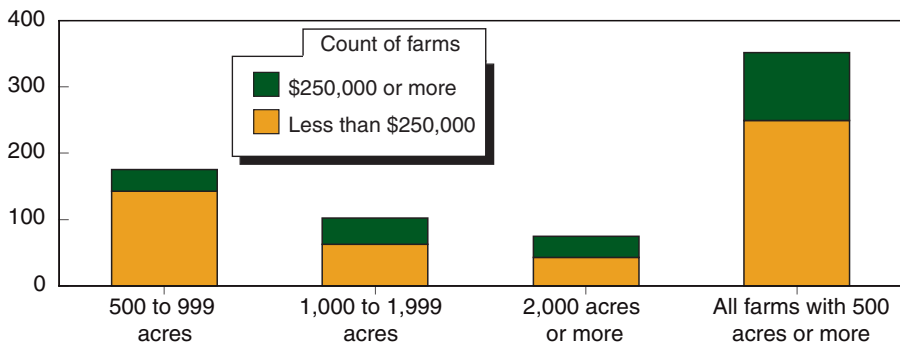
Nevertheless, the level of farm sales is arguably a better indicator of farm size. It measures farm production for the market in dollars, in comparison to the level of one input (land). The number of acres necessary to produce a given dollar amount of farm product varies with the characteristics of the land and the products produced. Cattle operations, for example, may have low sales, but many acres of pasture or range. Thus, not all farms that are large in acreage have high sales. In fact, most farms with more than 500 acres in 1997 were not classified as large farms (fig. 1-3), defined by the National Commission on

Figure 1-3

Farms with 500 acres or more by sales class, 1997

Farms with large acreages do not necessarily have large sales

1,000 farms with 500 acres or more



Percent of farms with 500 acres or more



Source: USDA, Economic Research Service, compiled from census of agriculture data.

Small Farms as farms with sales of \$250,000 or more (U.S. Department of Agriculture, National Commission on Small Farms, 1998).

When using sales to measure trends in farm size over time, it is important to adjust for changes in agricultural prices, which change revenue without any changes in the physical volume of production. Accordingly, this chapter adjusts sales of agricultural products for price changes using the Producer Price Index (PPI) for farm products, which is also the USDA/National Agricultural Statistics Service (NASS) index of prices received by farmers. Sales classes from the various censuses of agriculture presented in this chapter are expressed in 1997 constant dollars. Constant-dollar sales classes cannot be prepared before 1982, due to incomplete census records for individual farms prior to that year.

Change by Sales Class, 1982 to 1997

The distribution of farms by constant-dollar sales class, from 1982 onward, is consistent with the distribution by acreage class. Large farms (sales of at least \$250,000) grew consistently over the 16-year period (table 1-1), from 104,000 in 1982 to 157,000 by 1997. Large farms' share of all farms also grew, from less than 5 percent to over 8 percent (fig. 1-4). Most farms in the large farm group had sales between \$250,000 and \$499,999, but the number of farms with sales of at least \$500,000 grew more rapidly (table 1-1).

The number of farms in the other sales classes declined in each intercensus period, except for farms with sales less than \$10,000. The number of farms with sales less than \$10,000 declined from 1982 to 1987 and from 1987 to 1992, but increased by 9 percent from 1992 to 1997. Most of the increase from 1992 to 1997 occurred among point farms (table 1-1).¹ Because of this growth, farms with sales less than \$10,000 now account for half of all U.S. farms.

Most of the increase in point farms, however, is due to a change in the classification of farms that enroll all their cropland in the Conservation Reserve

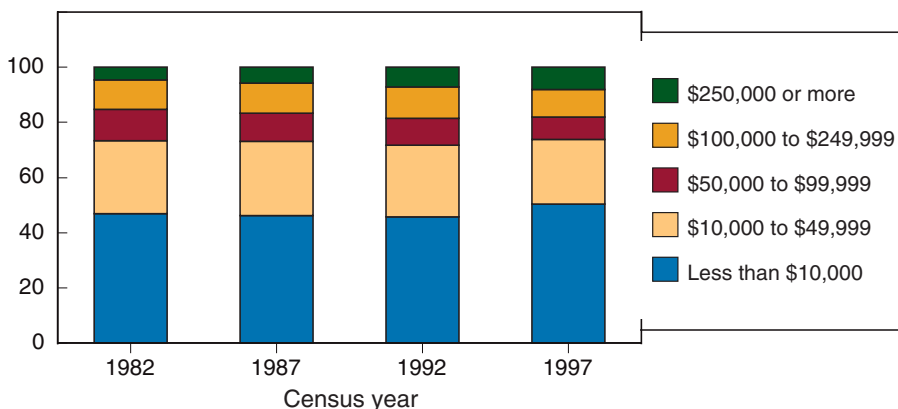
¹ If a place does not have \$1,000 in sales, a point system assigns values for acres of various crops and head of livestock to estimate a normal level of sales. Point farms are farms with less than \$1,000 in sales that have points worth at least \$1,000. For more information, see Appendix IV, "Defining and Counting Farms."

Figure 1-4

Distribution of farms by constant dollar sales class, 1982-1997

Farms with sales less than \$10,000 or sales of \$250,000 or more increased their share of farms

Percent of farms



Source: USDA, Economic Research Service, compiled from census of agriculture data.

Table 1-1—Number of farms by constant-dollar sales class (1997 dollars), 1982, 1987, 1992, and 1997

Constant dollar sales class (1997 dollars)	Census year				Change		
	1982	1987	1992	1997	1982 to 1987	1987 to 1992	1992 to 1997
	<i>Number of farms</i>				<i>Percent</i>		
Total farms	2,240,976	2,087,759	1,925,300	1,911,859	-6.8	-7.8	-0.7
Sales less than \$10,000	1,051,510	966,743	879,842	962,966	-8.1	-9.0	9.4
Point farms ¹	253,147	235,562	212,580	277,248	-6.9	-9.8	30.4
Other farms	798,363	731,181	667,262	685,718	-8.4	-8.7	2.8
Sales between \$10,000 and \$49,999	592,328	557,006	502,229	444,745	-6.0	-9.8	-11.4
\$10,000 to \$19,999	262,616	256,448	234,770	212,120	-2.3	-8.5	-9.6
\$20,000 to \$24,999	82,080	78,078	68,709	61,920	-4.9	-12.0	-9.9
\$25,000 to \$39,999	167,003	151,212	137,341	117,196	-9.5	-9.2	-14.7
\$40,000-49,999	80,629	71,268	61,409	53,509	-11.6	-13.8	-12.9
Sales between \$50,000 and \$99,999	253,069	217,479	186,937	158,160	-14.1	-14.0	-15.4
Sales between \$100,000 and \$249,999	239,923	228,514	216,334	189,417	-4.8	-5.3	-12.4
Sales of \$250,000 or more (large farms)	104,146	118,014	139,958	156,571	13.3	18.6	11.9
\$250,000-\$499,999	70,173	76,764	86,968	87,777	9.4	13.3	0.9
\$500,000-\$999,999	22,914	27,151	34,911	42,860	18.5	28.6	22.8
\$1,000,000-\$2,499,999	8,090	10,250	13,139	19,069	26.7	28.2	45.1
\$2,500,000-\$4,999,999	1,724	2,213	2,919	4,066	28.4	31.9	39.3
\$5,000,000 or more	1,245	1,636	2,021	2,799	31.4	23.5	38.5

¹Point farms have sales of less than \$1,000 (current dollars), but are still considered farms because they would be expected to normally sell at least \$1,000 of agricultural products. Point farms are defined in current dollars, rather than constant dollars, because they are identified in each census on the basis of current dollars.

Source: USDA, Economic Research Service, compiled from census of agriculture data.

or Wetlands Reserve Programs (CRP or WRP). The agricultural census did not count such operations as farms in 1992 if they did not sell at least \$1,000 worth of farm products (U.S. Dept. of Commerce, Bureau of the Census, 1994). They were counted as point farms in the 1997 Census, however, on the grounds that they normally could have sold \$1,000 worth of products (U.S. Department of Agriculture, National Agricultural Statistics Service, 1999a).

There were 66,700 of these CRP/WRP establishments in 1992. When these farms are added to the 1992 count of point farms to be consistent with the 1997 Census, the change in the number of point farms between 1992 and 1997 shifts from a gain of 30 percent (as shown in table 1-1) to a loss of 1 percent. In addition, the 9-percent increase in the number of farms with sales less than \$10,000 drops to a 2-percent increase. This means that most of the apparent large increase in farms with sales less than \$10,000 actually did not occur.

Distribution of Sales

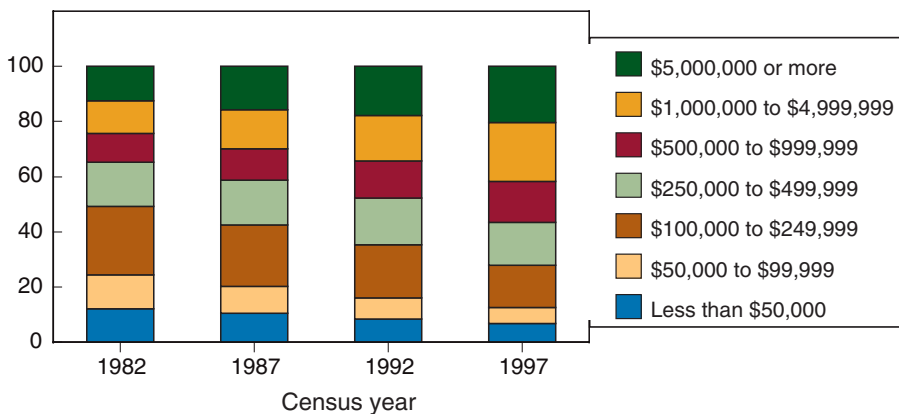
From 1982 to 1997, changes in the distribution of sales were actually larger than changes in the distribution of the farms themselves. The share of sales attributed to large farms increased steadily from 51 percent in 1982 to 72 percent in 1997 (fig. 1-5). The largest share increases occurred in the classes of farms with sales of \$1,000,000 to \$4,999,999 (1.2 percent of farms in

Figure 1-5

Distribution of sales by constant-dollar sales class, 1982-1997

Large farms' share of sales increased from 51 percent in 1982 to 72 percent in 1997

Percent of total sales



Source: USDA, Economic Research Service, compiled from census of agriculture data.

1997) and \$5 million or more (0.1 percent of farms). Each of these sales classes now accounts for about one-fifth of U.S. agricultural sales.

In discussions of farm structure, the growing share of production on fewer farms and fewer acres is referred to as concentration. Concentration has been underway for at least a century. It took 17 percent of U.S. farms to produce 50 percent of farm sales in 1900 (Peterson and Brooks, 1993). By 1997, just 2 percent of farms accounted for half of U.S. agricultural sales (U.S. Department of Agriculture, National Agricultural Statistics Service, 1999a). This 2 percent includes all the farms with sales above \$1 million in table 1-1, plus 47 percent of the farms with sales between \$500,000 and \$999,999 (see box, “Measuring Concentration”).

This discussion of concentration is based on data from various censuses of agriculture through 1997. Trends in concentration after 1997 rely on data from the annual Agricultural Resource Management Survey (ARMS). ARMS shows a continuing trend toward concentration: farms with sales of \$1 million or more increased their share of sales from 34 percent in 1997 to 44 percent in 2001.²

Diversity Among U.S. Farms

Despite the rapid growth in the number of farms with sales of at least \$250,000, more than 90 percent of farms in recent years have had sales below that level—according to ARMS—and thus were classified as small. The farm typology—outlined in the introduction—is used here to examine the diversity among U.S. farms, both large and small. The typology groups differ in their contribution to agricultural production, their product specialization, farm program participation, and other characteristics. (Remember that in the typology, family farms with sales greater than \$250,000 are classified into two groups—large family farms and very large family farms—rather than a single “large” category.)

² The ARMS estimate of the share of 1997 total sales from farms with sales greater than \$1 million is lower than the corresponding estimate from the 1997 Census of Agriculture (34 percent versus 42 percent) because ARMS undersamples farms with sales of \$1 million or more. For more information, see Appendix IV, “Defining and Counting Farms.”

Measuring Concentration

The census of agriculture provides a measure of concentration, the share of farms (starting with the largest and working down) needed to produce a certain level of output. For example, in 1997 the largest 2 percent of farms accounted for 50 percent of gross farm sales. The census measure, however, is sensitive to the number and production of small farms as well as the level of sales of the largest farms. For example, consider a massive farm consolidation that results in only 20 farms. The census measure would actually show less concentration than currently exists, if production were evenly distributed among the 20 remaining farms. Another measure (often used in studies of manufacturing) measures the share of industry output accounted for by the largest firms, often the largest 4, 8, 20, or 50 firms.

Family farms may be organized as proprietorships, partnerships, or family corporations. Nonfamily farms include those organized as nonfamily corporations or cooperatives, as well as any proprietorships, partnerships, or family corporations with hired managers. Most farms in 2001 (97 percent) were family farms. Even the largest farms tend to be family farms. For example, 86 percent of the farms with sales of \$1 million or more in 2001 were family farms, and 63 percent of the farms with sales of \$5 million or more were family farms. Large family farms are often organized as family corporations, and these account for a growing share of farm sales (fig. 1-6). The share of farms and sales accounted for by nonfamily corporations is small and has been relatively stable since 1978.

Figure 1-6

Distribution of farms and farm product sales, by business organization, 1978-97

Nonfamily corporations' share of farms and sales is stable

Percent of farms or sales



¹Includes cooperatives, estates or trusts, and institutional farms.

Source: USDA, Economic Research Service, compiled from Reimund and Gale (1992) and census of agriculture data.

Share of Farms, Production, and Assets

Although 91 percent of U.S. farms are small family farms, they account for just 28 percent of production (fig. 1-7). Large and very large family farms make up only 7 percent of U.S. farms, but they produce more than half (58 percent) of agricultural production. Nonfamily farms make up the remainder of farms, and they account for about 14 percent of agricultural production.

Nevertheless, small farms make significant contributions to the production of specific commodities. For example, small farms account for 74 percent of the value of production for oats, 67 percent for tobacco, 60 percent for hay, 47 percent for wheat, 45 percent for soybeans, 39 percent for corn, and 38 percent for beef cattle. At the other extreme, small farms account for only 11 percent of the value of production for hogs, 12 percent for high-value crops (vegetables, fruits and tree nuts, and nursery/greenhouse products), and 16 percent for poultry.

Most small farm production is concentrated among low- and high-sales farms, which together account for more than one-fifth of all U.S. production. High-sales farms actually produce about as much as large family farms. In contrast, limited-resource, retirement, and residential/lifestyle farms account for 6 percent of production, although they make up 60 percent of U.S. farms.

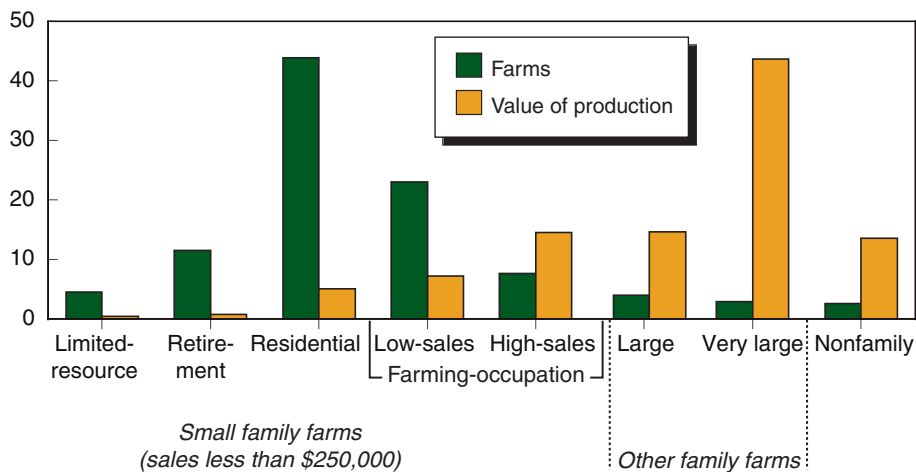
The share of assets and land held by small farms is substantially more than their 28-percent share of production. Small farms hold about 68 percent of all farm assets, including 60 percent of the land owned by farms (fig. 1-8). The small farm share of land operated, which includes the land farmers rent as well as own, is about the same as the share of land that small farms own. Real estate, including the dwelling of the operator, makes up most of farm assets (fig. 1-9). As custodians of the bulk of farm assets—including land—

Figure 1-7

Share of total farms and value of production, 2001

Large, very large, and nonfamily farms account for 72 percent of the value of production

Percent of total farms or production



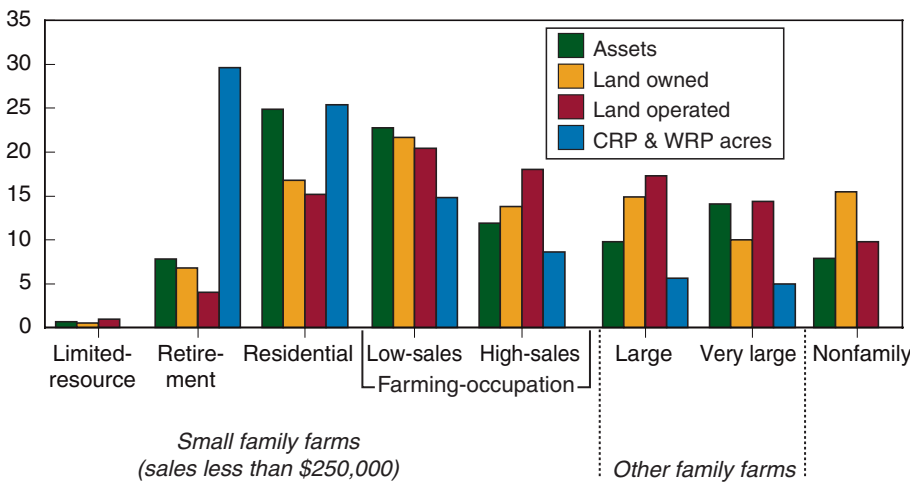
Source: USDA, Economic Research Service, 2001 Agricultural Resource Management Survey, Phase III.

Figure 1-8

Share of farm business assets, acres owned, and acres enrolled in the Conservation Reserve and Wetlands Reserve Programs (CRP & WRP), 2001

Small farms account for most of the assets (including land) owned by farms

Percent of total farm assets, acres owned, or program acres



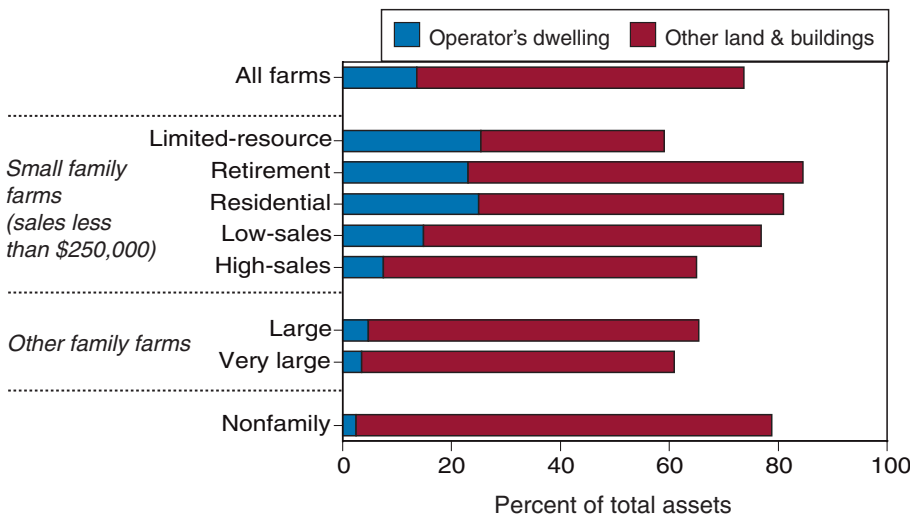
Note: The share of acres that limited-resource and nonfamily farms enroll in CRP and WRP is suppressed, due to insufficient observations.

Source: USDA, Economic Research Service, 2001 Agricultural Resource Management Survey, Phase III.

Figure 1-9

Share of farm business assets in real estate, 2001

Most farm assets are in real estate



Source: USDA, Economic Research Service, 2001 Agricultural Resource Management Survey, Phase III.

small farms play a large role in natural resource and environmental policy. For example, retirement farms and residential farms together account for 55 percent of the land enrolled by farm operators in the Conservation Reserve and Wetlands Reserve Programs (CRP and WRP) (fig. 1-8).³

³ Retired farms enrolled about 31 percent of the land they owned in the CRP or WRP. Residential/lifestyle farms enrolled 8 percent of their land in the programs, which was still higher than the 3-percent enrollment share for farms not classified as retirement or residential/lifestyle.

Shifting Shares

The 2001 ARMS provides information on the current distribution of farms and production by the ERS farm typology. The distribution of farms and production by the typology, however, was somewhat different in the recent past. Although the typology was created in 1997 and 1998, it can be extended back to 1993,⁴ which means changes can be observed over an 8-year period, 1993 to 2001. Year-to-year changes are generally minor, but they accumulate over the whole period. As a result, only the endpoints for the period (1993 and 2001) are presented.

One significant change is the increase in the share of farms in the residential/lifestyle category, from 36 percent in 1993 to 44 percent in 2001 (fig. 1-10). This shift reflects substantial growth in the number of residential/lifestyle farms, from 736,300 in 1993 to 943,200 in 2001. Other smaller—but statistically significant—changes were declines in share for limited-resource, low-sales, and high-sales small farms and increases for large and very large family farms.

The large change in the residential/lifestyle group's share of farms had little effect on the group's share of production (fig. 1-11). Very large farms, on the other hand, increased their share of the value of production from 32 to 44 percent. Most of this shift to very large farms came from low- and high-sales farms, whose combined share of production declined from 34 to 22 percent. This shift is consistent with the concentration of sales among larger farms (see fig. 1-5).

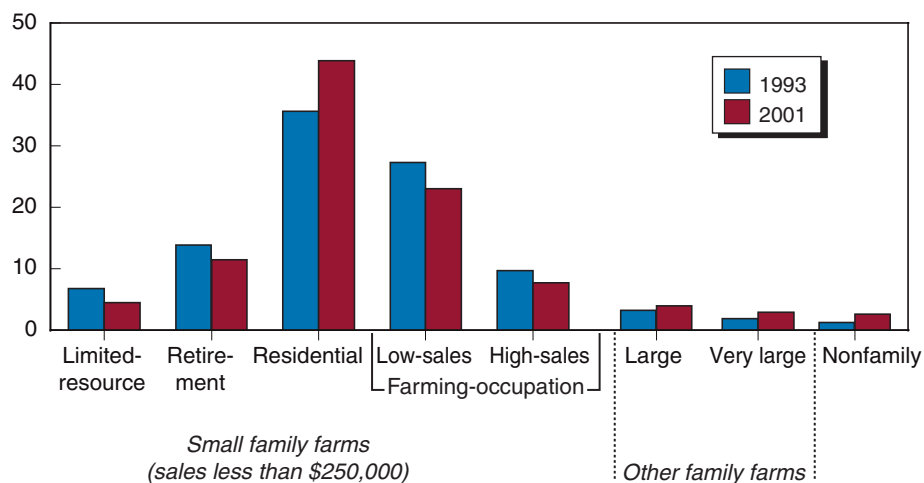
⁴ Beginning in 1993, the Farm Costs and Returns Survey—the predecessor to ARMS—allowed “retired” as an answer to its occupation question, making it possible to identify retirement farms for the first time.

Figure 1-10

Share of total farms, 1993 and 2001

The greatest increase was in the residential/lifestyle group

Percent of total farms



Note: The 1993 typology groups are defined in 2001 constant dollars. Sales were adjusted using the Producer Price Index (PPI) for farm products. Household income was adjusted by the Consumer Price Index (CPI). Farm assets were adjusted by changes in the value of farm real estate per acre.

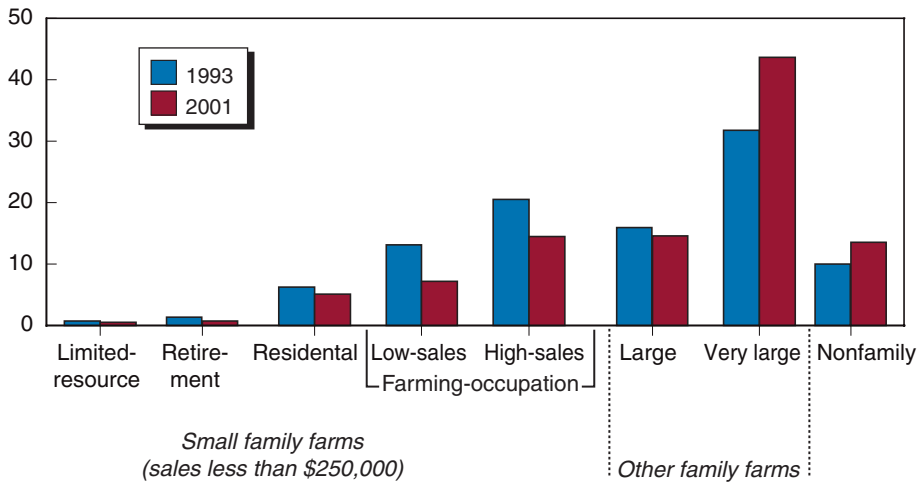
Sources: USDA, Economic Research Service, 1993 Farm Costs and Returns Survey and 2001 Agricultural Resource Management Survey, Phase III.

Figure 1-11

Share of total value of production, 1993 and 2001

Production shifted to very large family farms

Percent of total production



Note: The 1993 typology groups are defined in 2001 constant dollars. Sales were adjusted using the Producer Price Index (PPI) for farm products. Household income was adjusted by the Consumer Price Index (CPI). Farm assets were adjusted by changes in the value of farm real estate per acre.

Sources: USDA, Economic Research Service, 1993 Farm Costs and Returns Survey and 2001 Agricultural Resource Management Survey, Phase III.

Changes in the distribution of farm assets (not shown) followed a pattern similar to shifts in production. The share for very large farms increased while the shares for low-sales and high-sales farms decreased.

Farm Size and Tenure

Variation in size—measured in either sales or acres—helps explain the distribution of agricultural production. Limited-resource, retirement, and residential/lifestyle farms account for only 6 percent of production because most of these farms are very small. Roughly three-fourths of the farms in each of the three groups have sales less than \$10,000 (table 1-2). The average acreage operated for farms in these three groups is also small, ranging from 100 to 156 acres.

Although only 36 percent of farming-occupation/low-sales farms have sales less than \$10,000, three-fourths of these farms have sales less than \$50,000. On average, low-sales farms operate 395 acres, or more than double the averages for the limited-resource, retirement, or residential/lifestyle farms. This average is small, however, compared with those for farming occupation/high-sales farms, large family farms, and very large family farms. Households operating limited-resource, retirement, or residential/lifestyle farms receive a large share of their income from off-farm sources (see chapter 2).

Average farm size ranges from 1,000 to 2,200 acres for high-sales small farms, large family farms, and very large family farms. About two-thirds of the farms in each of these groups are part owners, meaning that they own

Table 1-2—Farm size and tenure, by farm typology group, 2001

Item	Small family farms					Large family farms	Very large family farms	Nonfamily farms	All farms
	Limited-resource	Retirement	Residential/lifestyle	Farming-occupation Low-sales High-sales					
<i>Number</i>									
Total farms	96,127	247,230	943,192	494,490	165,472	85,098	62,635	*55,440	2,149,683
<i>Percent of group</i>									
Sales class:									
Less than \$10,000	73.9	80.8	75.5	35.9	na	na	na	d	55.4
\$10,000 to \$49,999	*21.4	15.5	19.4	39.4	na	na	na	d	20.7
\$50,000 to \$99,999	d	d	3.2	24.7	na	na	na	d	7.8
\$100,000 to \$174,999	na	d	1.4	na	63.0	na	na	d	5.6
\$175,000 to \$249,999	na	d	d	na	37.0	na	na	d	3.3
\$250,000 to \$499,999	na	na	na	na	na	100.0	na	*5.8	4.1
\$500,000 or more	na	na	na	na	na	na	100.0	**10.0	3.2
<i>Acres per farm</i>									
Land operated per farm ¹	100	156	154	395	1,042	1,948	2,202	**1,698	446
Owned	30	157	101	249	475	997	908	**1,586	265
Rented in	75	17	63	168	582	998	1,324	***196	200
Rent out	**6	*18	*11	23	*14	**48	30	**84	18
<i>Percent of group</i>									
Tenure:									
Full owner	49.5	83.3	63.6	55.2	20.7	16.2	21.9	74.5	57.2
Part owner	*15.1	15.9	31.2	37.8	65.6	70.4	62.9	***12.2	34.9
Tenant	*35.4	d	5.2	7.0	13.7	13.5	15.2	**13.3	8.0

d = Data suppressed due to insufficient observations. na = Not applicable. * = Standard error is between 25 and 50 percent of the estimate. ** = Standard error is between 51 and 75 percent of the estimate. *** = Standard error is between 76 and 100 percent of the estimate.

¹Includes land used for crops or livestock part of the year and rented to another operation during another part of the year, not shown separately.

Source: USDA, Economic Research Service, 2001 Agricultural Resource Management Survey, Phase III.

part of the land they operate and rent the rest method of renting land has changed from a method for entry into farming to a method of expansion by controlling additional land without the debt and commitment of capital associated with ownership (Reimund and Gale, 1992).

Full ownership was the most common tenure category among retirement, residential/lifestyle, and low-sales farms. About 75 percent of nonfamily farms were also full-owners, reflecting the 68-percent share of nonfamily farms with sales less than \$50,000 (not shown).⁵ Owners of these smaller nonfamily farms frequently acquired their farms through an inheritance or as a small investment in agriculture and then contracted out the operation of the farm to a manager who, most likely, managed several of these small farms at the same time. Because these small farms have a hired manager, they are classified as nonfamily farms, even though they are not nonfamily corporations or cooperatives. The relatively high average acreage for nonfamily farms reflects a small share of very large farms in the group.

Other farmers own little of the land rented by farmers. Farmers reported renting out 39 million acres to others in 2001, less than one-tenth of the 429 million acres they rented in. The rest of the rented land came from nonoper-

⁵ The 2001 ARMS sample was not large enough to publish a detailed distribution of nonfamily farms by sales class. ARMS data from earlier years, however, show that a substantial share of nonfamily farms are very small. Between a third and a half of nonfamily farms have sales of less than \$10,000 in any given year.

ator landlords, some of whom may have retired from farming or otherwise have a farming background. According to the 1999 Agricultural Economics and Land Ownership Survey (AELOS), nonoperator landlords made up 42 percent of the 3.4 million farmland owners in 1999 (U.S. Department of Agriculture, National Agricultural Statistics Service, 2001). Ninety-five percent of nonfarm landlords were individuals/families or partnerships, largely older people. Of the unincorporated landlords, 55 percent were at least 65 years old and another 11 percent were between age 60 and 64.

Specialization and Diversification

Specialization differs widely by the typology, but some types of specialization are more common for small farms. Between 32 and 43 percent of limited-resource, retirement, residential/lifestyle, and low-sales small farms specialize in beef cattle (table 1-3). Beef cattle—particularly cow-calf operations—often have low labor requirements (Cash, 2002) and are compatible with off-farm work and retirement.

The tax code may also provide an incentive for specialization in cow-calf enterprises, particularly for residential/lifestyle farms, which—as a group—report substantial losses from farming (see chapter 2). Losses from farming can be written off against income from other sources when calculating income tax. The writeoff is unlimited if the farm has the potential to be profitable and the filer is materially involved in running the farm (Freshwater and Reimer, 1995). Residential/lifestyle farmers—particularly those with high off-farm earnings—can take advantage of this writeoff by producing a commodity that allows them to group their expenses and sales in different years to generate small profits in some years and large losses in others.

Other field crops are also a common specialization for limited-resource, retirement, and residential farms. This category includes farms with all their crop acres in the CRP and WRP, as well as farms specializing in various crops. Approximately 25 percent of residential/lifestyle farmers specialize in other livestock, including horses, sheep, and goats.

As the level of sales increases, specialization changes. Two commodity groups—cash grains and dairy—make up over half of all high-sales small farms and large family farms. Over 25 percent of very large family farms specialize in poultry and hog production. Poultry production is closely linked with processors, as is much of hog production.

Production of high-value crops is heavily concentrated among very large family farms and nonfamily farms, which together account for 80 percent of high-value crop production. No more than 10 percent of any small farm group specializes in these crops.

One of the enduring myths about farm structure is that U.S. farms are generally modestly sized, diversified enterprises producing a variety of commodities (Gale and Harrington, 1993). In reality, farms vary in size and are rather specialized, with individual farms producing very few commodities. Sixty-three percent of U.S. farms produce only one or two commodities, and another 13 percent have no production at all. Farms with no production

Table 1-3—Commodity specialization and diversification, by farm typology group, 2001

Item	Small family farms				Large family farms	Very large family farms	Nonfamily farms	All farms	
	Limited-resource	Retirement	Residential/lifestyle	Farming-occupation Low-sales High-sales					
<i>Percent of group</i>									
Commodity specialization: ¹									
Cash grain ²	*14.6	5.8	8.3	17.7	33.8	34.6	22.1	*6.0	13.8
Other field crops ³	*25.9	39.5	23.6	15.0	12.1	10.9	d	d	22.3
High-value crops ⁴	d	d	5.9	8.8	*10.3	9.0	15.5	**16.0	7.2
Beef cattle	32.3	38.2	35.4	43.3	15.0	13.2	11.8	**24.7	34.0
Hogs	d	d	d	d	d	*5.7	9.3	d	1.1
Dairy	d	d	d	4.2	20.5	16.4	13.0	**1.8	4.0
Poultry	d	d	d	d	*3.4	8.1	16.1	d	1.7
Other livestock ⁵	d	12.1	24.9	9.7	d	d	d	d	15.8
<i>Number per farm</i>									
Mean number of commodities	1.3	0.9	1.1	1.7	2.6	2.8	2.7	**0.9	1.4
<i>Percent of group</i>									
Number of commodities produced: ⁶									
No commodities ⁷	d	27.7	15.6	*4.0	0	0	0	d	12.8
One commodity	28.2	41.7	44.6	30.3	14.6	14.8	18.4	**33.6	35.7
Two commodities	37.7	24.1	27.0	32.9	21.3	19.9	18.6	*14.1	27.2
Three commodities	d	d	7.7	14.6	20.6	20.8	22.2	**3.2	10.9
Four or more commodities	d	d	5.1	18.2	43.5	44.5	40.8	**6.7	13.4

d = Data suppressed due to insufficient observations. * = Standard error is between 25 and 50 percent of the estimate.

** = Standard error is between 51 and 75 percent of the estimate.

¹ Commodity that accounts for at least half of the farm's value of production.

² Includes wheat, corn, soybeans, grain sorghum, rice, and general cash grains, where no single cash grain accounts for the majority of production.

³ Tobacco, peanuts, cotton, sugar beets, sugar cane, corn for silage, sorghum for silage, hay, canola, oats, and general crops, where no single crop accounts for the majority of production. Also includes farms with all cropland in the Conservation Reserve or Wetlands Reserve Programs (CRP & WRP).

⁴ Vegetables, fruits and tree nuts, and nursery & greenhouse.

⁵ Includes sheep, goats, horses, mules, ponies, fur-bearing animals, bees, fish, and any other livestock. Also includes farms where no single livestock species accounts for the majority of production.

⁶ Based on 26 commodities or commodity groups.

⁷ Includes farms with no production due to drought, other adverse weather, crop and livestock disease, etc. Also includes farms with all cropland in the Conservation Reserve or Wetlands Reserve Programs (CRP & WRP).

Source: USDA, Economic Research Service, 2001 Agricultural Resource Management Survey, Phase III.

include those with all their cropland in the CRP and WRP, as well as farms experiencing crop failure or loss of livestock from disease or other causes. Many small farms have no production, or they specialize in a single commodity. High-sales small farms, large family farms, and very large family farms are more likely to produce multiple commodities, but even they produce a limited number of commodities. Nearly three-fifths of the farms in these groups produce no more than three commodities.

Government Program Participation

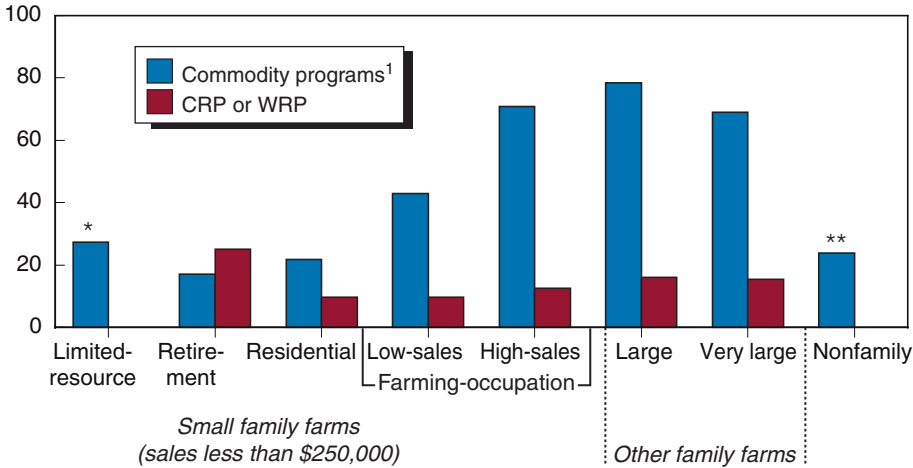
The relative importance of government programs varies by the typology. Between 69 and 78 percent of high-sales small farms, large family farms, and very large family farms receive commodity program payments (fig. 1-12). These three farm types also receive 75 percent of commodity program payments, roughly proportional to their production of program commodities (fig. 1-13). Farms that do not specialize in program commodities may

Figure 1-12

Farms receiving commodity program payments and payments from the Conservation Reserve or Wetlands Reserve Programs, 2001

Most high-sales, large, and very large farms receive payments from commodity programs

Percent of farms



Note: The share of limited-resource or nonfamily farms receiving CRP or WRP is suppressed, due to insufficient observations.

* = Standard error is between 25 and 50 percent of the estimate.

** = Standard error is between 51 and 75 percent of the estimate.

¹Agricultural disaster payments, loan deficiency payments, and transition payments.

Source: USDA, Economic Research Service, 2001 Agricultural Resource Management Survey, Phase III.

receive payments from commodity programs. For instance, dairy farms often produce corn to feed their cattle and thus could participate in commodity-related programs.

CRP and WRP—on the other hand—target particular types of land rather than the production of specific commodities. Thus, retirement and residential/lifestyle farms receive more than half of CRP and WRP payments, even though they produce little in the way of agricultural commodities. Twenty-five percent of retirement farms receive CRP or WRP payments (fig. 1-12), nearly double the 13-percent participation rate for all farms (not shown).

The large share of CRP and WRP payments going to residential/lifestyle farms, however, is not the result of a high participation rate. Only 10 percent of residential/lifestyle farms participate in the program, about the same rate as for all farms. For some residential/lifestyle farmers (particularly those with high off-farm income), the tax writeoff from farming may be more valuable than income from the CRP and WRP.

Instead, residential/lifestyle farms' share of CRP and WRP payments reflects their large numbers (44 percent of all farms) and their tendency to enroll large shares of their land when they do participate. Participating residential/lifestyle groups enroll an average of 44 percent of the land they operate, which is less than the 65-percent rate for participating retirement farms, but much more than the 25-percent rate for all participating farms.

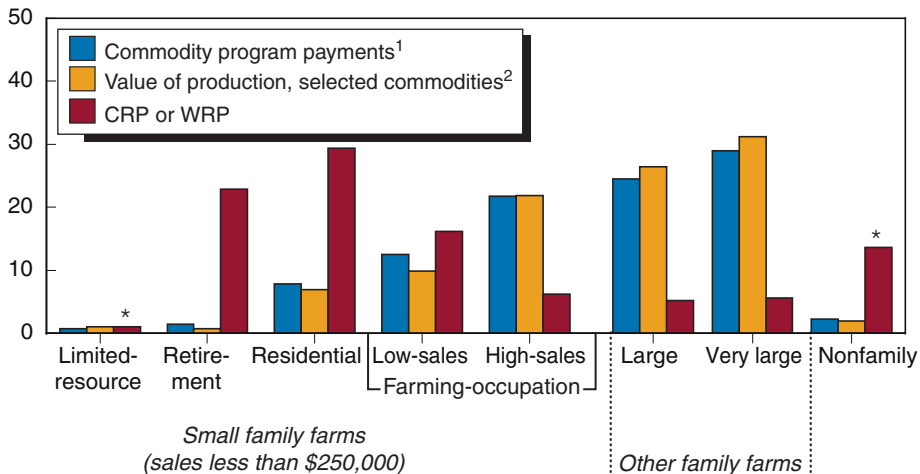
Residential/lifestyle operators' main job is off-farm, which limits the amount of time they can spend farming. Since WRP and CRP have rela-

Figure 1-13

Distribution of total payments from commodity programs, 2001

Production of program commodities explains the distribution of commodity program payments

Percent of total payments or production of selected commodities



* = Standard error is between 25 and 50 percent of the estimate.

¹Agricultural disaster payments, loan deficiency payments, and transition payments.

²Barley, corn, cotton, rice, sorghum, soybeans, wheat, and oats.

Source: USDA, Economic Research Service, 2001 Agricultural Resource Management Survey, Phase III.

tively low labor requirements, residential/lifestyle farmers may find the programs financially attractive. Given their life-cycle position, many retired farmers have land available to put into conservation uses. Alternatively, the assured and steady stream of rental payments coming from the CRP or WRP may make retirement a more viable option for some farmers.

Summary and Conclusions

Both acreage class and sales class data show a trend toward large farms, those farming at least 500 acres or selling at least \$250,000 in farm products. Compared with acreage class data, the sales class data capture less of an increase in the number of smaller farms, particularly after adjusting in 1992 to include CRP/WRP point farms.

The growth in the number of large farms was accompanied by a shift in production to large farms. The share of production accounted for by farms with sales of at least \$250,000 (in constant 1997 dollars) grew from 51 percent in 1982 to 72 percent 1997. By 1997, farms with sales of more than \$1 million accounted for 42 percent of sales, compared with 24 percent in 1982. The concentration of production has been occurring in the United States for at least a century. The share of farms necessary to produce half of all farm sales fell from 17 percent in 1900 to 2 percent in 1997.

However, the 2 percent of U.S. farms currently accounting for half of agricultural sales actually includes 46,100 farm operations, far too many for any individual farmer to hold much market power. In most industries, concentration is not considered a policy issue until a small number of firms—perhaps two to four—dominates the industry. Agriculture is not very concentrated by

this measure, although concentration is approaching a level for some commodities where it may become a concern. The 18 largest hog producers, for example, accounted for almost one-fourth of all hog marketings in 1997 (MacDonald et al., 2000).

The effects of concentration on the environment may actually be more of a concern than effects on market power. In particular, the concentration of livestock production on fewer farms and less land can lead to environmental problems if farms raising livestock do not have enough land to absorb the manure produced (Ribaudó, 2003; Ribaudó et al., 2003). Most farms currently have adequate land to safely use the manure that their livestock produce, applying the manure at agronomic rates (Gollehon et al., 2001; Gollehon and Caswell, 2000). Farms that do not have enough land to safely apply all the manure produced, however, account for more than 60 percent of the production of manure nitrogen and 70 percent of manure phosphorus.

Although farms with sales greater than \$250,000 experienced the fastest growth, 91 percent of all U.S. farms are classified as small family operations by the ERS typology. Despite their large number, small family farms account for only 28 percent of the value of agricultural production. Still, small farms (largely low- and high-sales farms) account for relatively large shares of the value of production for specific crops (oats, tobacco, hay, wheat, corn, and soybeans) and beef.

Small family farms also own three-fifths of the farmland held by U.S. farms and account for a similar share of the land operated. Because of their large landholdings, laws and programs addressing natural resource quality and conservation are among the policy instruments affecting the small family farm. CRP and WRP are particularly attractive to some small farmers. Retirement and residential/lifestyle farms together account for more than half of the land enrolled in the programs, and they receive more than half of the payments from the programs.

The share of CRP and WRP enrollments accruing to these groups has implications for the administration of the programs. If an advanced age and an off-farm occupation are major determinants of land going into land conservation programs, it may be relatively easy to get smaller farms to enroll land in the programs. Getting larger farms operating as commercial enterprises to enroll may require greater financial incentives because the opportunity cost of idling their land is larger.

While the CRP and WRP are important to retirement and residential/lifestyle farms, commodity programs are most relevant to high-sales small farms, as well as large and very large family farms. These groups produce most of the commodities that farm programs have traditionally supported.

Farms in the United States tend to be specialized, contrary to popular belief. About two-thirds of U.S. farms produced only one or two commodities in 2001. In addition, nearly three-fifths of family farms with sales greater than \$100,000 produced no more than three commodities. Lack of diversification increases risk. This risk, however, can be alleviated by receipt of income from off-farm sources, enrollment in farm programs, crop insurance, and other measures.

Farm Household Income, Farm Structure, and Off-Farm Work

Erik O'Donoghue and Robert A. Hoppe

Farm structure is closely intertwined with farm households' uses of off-farm employment, in ways that greatly reduce what we can learn from aggregate statistics. One major component of the farm sector, very large family farms, specializes in farm activities and draws little or no income from off-farm employment but accounts for almost half of all farm output. At the same time, residential/lifestyle farms account for a growing share (nearly half) of all U.S. farms and dominate average off-farm income measures because of their number and high household income, even though they account for a very small share of farm output. Falling between these two groups are family farms whose sales range from \$10,000 to nearly \$1 million a year. For these farms, off-farm earnings—often from jobs held by spouses—are an important component of household income.

Introduction

More than half of all U.S. farm households lose money farming, and many of those show off-farm employment as an important component of their household income. However, some households, usually operating large farms, report large income from farming and receive relatively little off-farm income. Many farm households combine income from farming, off-farm employment, and other sources. In this chapter, we use the ERS farm typology to link the structure of farming to the sources of household income, and trace recent changes in those sources.

We begin by reporting mean household income in 2001 for all farm households and for the seven family farm typology groups (table 2-1). Operator household income is defined to be consistent with the Census Bureau's definition of money income used in the Current Population Survey.¹ Operator household income is divided into three components: farm earnings, earned off-farm income, and unearned off-farm income. Earned off-farm income comes from off-farm self-employment or wage and salary jobs. Unearned off-farm income includes interest and dividends, benefits from Social Security and other public programs, alimony, annuities, net income of estates or trusts, and private pensions.²

In the aggregate, farm households cannot be considered a low-income group. Across all family farms, mean household income in 2001—\$64,500—was 11 percent greater than the mean for all U.S. households. For all family farms, most income (\$58,900 or 91 percent) was derived from off-farm sources, with earned off-farm income amounting to more than

¹ For more detail, see Appendix II, "Measuring Farm Operator Household Income."

² The word "unearned" is not derogatory; it simply identifies income from sources other than employment. Unearned income often reflects earned income received earlier in life. For example, elderly people might receive interest income because they saved earned income when they were younger.

\$43,000, on average. Operators of residential/lifestyle, large, or very large farms received income significantly above the mean for all U.S. households, while operators in the limited-resource, retirement, and low-sales groups had mean income that fell below it.

Mean income may not always be the best choice for comparison because a few very high-income households can raise the mean well above the income earned by most households. For that reason, we also show median income in figure 2-1. Median income falls at the midpoint of the distribution of income for all households: half of all households have incomes above the median, while the other half have incomes that are below that level. Median income for all farm households, at \$45,100, falls 30 percent below the mean for all farm households (fig. 2-1), and most farm operator households (64 percent) report income below the mean reported for their group in table 2-1. Similarly, the median U.S. household income, \$42,200 in 2001, also falls well below the corresponding mean of \$58,200. However, the median income for all farm households still exceeds the median for all U.S. households.³

³ The wide gap between median and mean incomes for very large family farms and residential/lifestyle farms (fig. 2-1) indicates that, within each type, a relatively small number of households with quite substantial incomes raise the mean significantly. Sixty-eight percent of residential/lifestyle farms and 69 percent of very large farms report incomes below the means for their category.

Table 2-1—Operator household income, by farm typology group, 2001

Item	Small family farms				Large family farms	Very large family farms	All family farms	
	Limited-resource	Retirement	Residential/lifestyle	Farming-occupation Low-sales High-sales				
<i>Number</i>								
Total households	94,249	244,200	940,291	501,192	165,485	85,155	62,199	2,092,772
<i>Dollars per household</i>								
Mean household income	7,948	47,602	81,252	35,866	53,617	70,194	213,982	64,465
Farm earnings	-3,165	** -1,070	-5,694	* -2,552	26,497	37,182	181,660	5,571
Off-farm income	11,113	48,672	86,947	38,417	27,120	33,011	32,321	58,894
Earned ¹	6,272	10,341	77,333	17,493	18,788	18,915	20,407	43,286
Unearned ¹	4,841	38,330	9,614	20,925	8,332	*14,096	11,914	15,608
<i>Percent</i>								
Mean household income compared with U.S. mean ²	13.7	81.8	139.6	61.6	92.1	120.6	367.6	110.7
Share from off-farm sources ³	139.8	102.2	107.0	107.1	50.6	47.0	15.1	91.4
Share of off-farm income from earnings	56.4	21.2	88.9	45.5	69.3	57.3	63.1	73.5
Households with:								
Positive household income and—								
Loss from farming	57.3	54.2	75.6	48.0	9.5	11.5	5.5	55.7
Gain from farming	*23.9	44.1	23.5	39.9	77.3	73.6	78.6	37.8
Negative household income	*18.8	d	d	12.1	13.2	14.9	15.9	6.5

d = Data suppressed due to insufficient observations. * = Standard error is between 25 and 50 percent of the estimate.

** = Standard error is between 51 and 75 percent of the estimate.

¹ Earned income comes from off-farm self-employment or wage and salary jobs. Unearned income includes interest and dividends, benefits from Social Security and other public programs, alimony annuities, net income of estates or trusts, and private pensions.

² Mean farm household income divided by U.S. mean household income (\$58,208).

³ Income from off-farm sources can be more than 100 percent of total household income if earnings of the operator household from farming are negative.

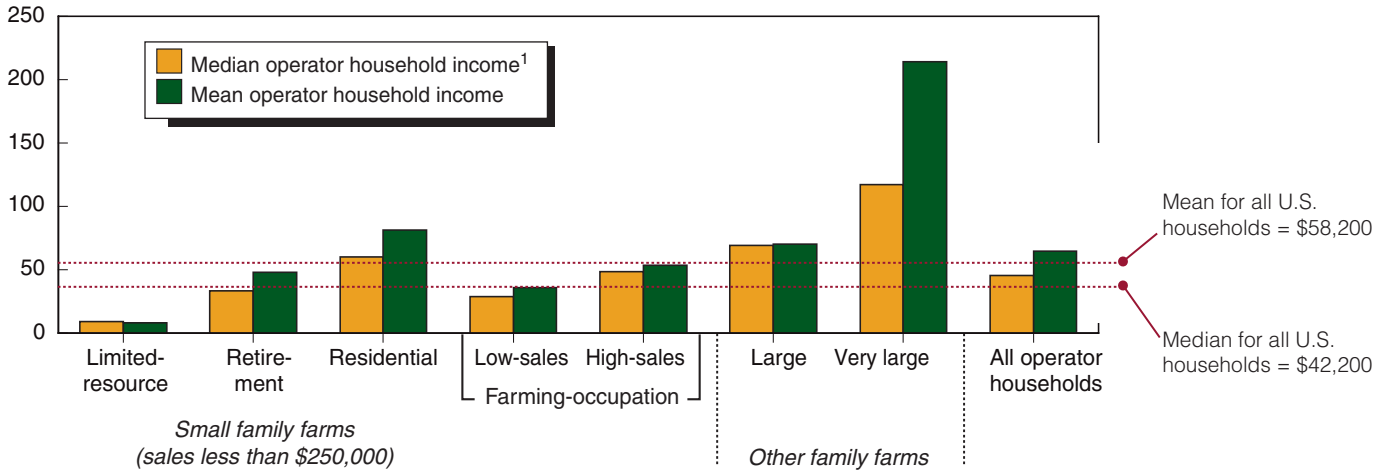
Source: USDA, Economic Research Service, 2001 Agricultural Resource Management Survey, Phase III, version 1, for operator households. Current Population Survey (U.S. Department of Commerce, Bureau of the Census, 2002) for all U.S. households.

Figure 2-1

Median and mean operator household income, 2001

Households operating residential/lifestyle, large, or very large farms have income above the median or mean for all U.S. households

\$1,000 per household



¹Half of the households have income below the indicated level, and half have income above the indicated level.

Source: USDA, Economic Research Service, 2001 Agricultural Resource Management Survey, Phase III, version 1, for operator households. Current Population Survey (U.S. Department of Commerce, Bureau of the Census, 2002) for all U.S. households.

Households operating residential farms have much higher earned off-farm income than do other farm households (table 2-1). Mean earned off-farm income, when measured across all farm households, amounted to \$43,300 in 2001. However, six of the seven farm typology groups have means that are less than half that amount; earned income ranges from just over \$6,000 a year for limited-resource farm households to \$20,400 for households operating very large family farms. Households running residential farms, with mean off-farm earned income of \$77,300, have a large effect on the overall average across all households.

Income also varies across households within a farm type. Even among households operating very large family farms, who report mean farm earnings of \$181,700, 6 percent report a loss from farming that is counterbalanced by off-farm income, while another 16 percent report negative household income, usually accompanied by a loss from farming.

Earned off-farm income and the value of farm output varies inversely. For households operating very large family farms—which accounted for 44 percent of the value of farm output in 2001 (chapter 1, fig. 1-7)—earned off-farm income accounts for just 10 percent of their household income. Earned off-farm income accounted for much larger shares of household income for farms with sales between \$100,000 and \$500,000 per year. Households in these two sales categories obtained about a third of their household income, on average, from earned off-farm income, and their farm operations accounted for about 15 percent of the value of farm output in 2001. Residential farms, in comparison, accounted for only 5 percent of the value of farm output, while their farm households obtained about 95 percent of their income from off-farm employment.

Finally, residential farm households report considerable losses from farming. Given the large number of residential households, these losses totaled over \$5 billion in 2001.

An Anatomy of Recent Growth In Off-Farm Income

While farmers have worked off the farm for decades, the frequency of this practice has grown substantially over the last 75 years. In 1929, only 1 farmer in 16 reported 200 or more days of off-farm labor. By 1947, one in six reported that much off-farm work, and by 1997, the figure had grown to one in three farmers (Gardner, 2002).

Several factors contributed to the longrun increase in off-farm work, including better education and economic growth in the nonfarm economy. Transportation improvements made it easier for farm operators and their spouses to work off the farm, and better infrastructure and changing regulatory and labor environments led to more manufacturing jobs in rural areas.

Today, off-farm income is the primary means of support for many farm operator households, and appears to have grown rapidly in recent years. Between 1997 and 2001, mean household income grew significantly, and that growth was entirely accounted for by changes in off-farm income, which grew by 27 percent (table 2-2). Unearned income grew by 32 percent while earned off-farm income grew by 25 percent. Inflation, as measured by the Consumer Price Index, rose by 10 percent over the 4 years, so real (inflation-adjusted) off-farm income also grew substantially. In contrast, mean household income for the U.S. as a whole grew 17 percent, before adjusting for inflation, during this 4-year period.

Growth in off-farm income largely reflects changes in residential/lifestyle farms. We use the ERS farm typology to provide a closer look, in table 2-3. The table covers 1997-2001 and reports mean farm earnings for households in each farm type, as well as mean off-farm household income from all sources (earned and unearned) and off-farm income from earned sources only.

Table 2-2—Farm operator household income and U.S. household income, 1997-2001

Item	1997	1998	1999	2000	2001
	<i>Dollars per household</i>				
Farm household income	52,562	59,734	64,166	62,290	64,465
Earnings from farming	6,205	7,106	6,178	3,062	5,571
Total off-farm income	46,358	52,628	57,988	59,228	58,894
Earned ¹	34,552	39,148	44,658	43,269	43,286
Unearned ¹	11,806	13,480	13,330	15,959	15,608
U.S. household income	49,642	51,855	54,842	57,045	58,208

¹ Earned income comes from off-farm self-employment or wage and salary jobs. Unearned income includes interest and dividends, benefits from Social Security and other public programs, alimony annuities, net income of estates or trusts, and private pensions.

Source: USDA, Economic Research Service, Agricultural Resource Management Survey, Phase III, for farm operator households. Current Population Survey (U.S. Department of Commerce, Bureau of the Census, 2002) for all U.S. households.

Table 2-3—Selected components of farm household income by farm typology group, 1997-2001

Item	1997	1998	1999	2000	2001
<i>Dollars per household</i>					
Farm earnings:					
Limited-resource	-3,229	*-3,230	-3,571	*-2,978	-3,165
Retirement	***1,157	***-1,499	*-1,434	*-1,304	** -1,070
Residential/lifestyle	-3,668	-4,309	-4,106	-5,842	-5,694
Farming occupation/low-sales	***1,216	*-2,413	***-338	*-2,067	*-2,552
Farming occupation/high-sales	22,047	21,463	26,336	14,194	26,497
Large	45,233	59,288	50,553	44,483	37,182
Very large	169,034	175,866	164,543	139,222	181,660
Total off-farm income:					
Limited-resource	11,833	13,153	13,108	13,981	11,113
Retirement	39,358	47,158	41,991	44,456	48,672
Residential/lifestyle	69,426	76,390	87,818	84,325	86,947
Farming occupation/low-sales	32,917	37,186	39,926	48,412	38,417
Farming occupation/high-sales	28,916	28,717	26,621	31,243	27,120
Large	34,460	47,252	34,598	39,577	33,011
Very large	36,289	33,240	35,572	38,525	32,321
Earned off-farm income: ¹					
Limited-resource	5,226	7,035	5,861	5,917	6,272
Retirement	8,609	16,445	11,254	11,981	10,341
Residential/lifestyle	63,034	67,752	79,963	75,578	77,333
Farming occupation/low-sales	22,870	21,468	22,409	25,015	17,493
Farming occupation/high-sales	14,654	20,759	19,193	20,645	18,788
Large	24,887	31,054	24,020	23,495	18,915
Very large	22,656	21,639	23,360	25,485	20,407

* = Standard error is between 25 and 50 percent of the estimate. ** = Standard error is between 51 and 75 percent of the estimate. *** = Standard error is above 75 percent of the estimate.

¹ Earned income comes from off-farm self-employment or wage and salary jobs.

Source: USDA, Economic Research Service, Agricultural Resource Management Survey, Phase III.

Growth in off-farm income occurred primarily among households with residential/lifestyle farms, where mean earned off-farm income grew by 22 percent between 1997 and 2001. Comparing income growth among all farm households (table 2-2) with that for specific farm types (table 2-3) shows that earned off-farm income grew more rapidly, by 25 percent between 1997 and 2001, when measured across all farms than it does when measured within any farm type. That difference reflects the growing share of all farm households that are residential/lifestyle. The rapid growth in mean earned off-farm income among residential households probably reflects, to a great extent, turnover, with new entrants possessing noticeably higher income than exiting households.

Off-farm income also varies by farm size, as measured by the gross value of sales. Households with large and small farms differed substantially in levels and growth of off-farm income (table 2-4). In 2001, the mean off-farm income for households operating farms producing more than \$100,000 of agricultural products ranged between \$31,000 and \$35,000, depending on size class. None of the larger size classes showed any systematic growth of off-farm income over the 4-year period.

Table 2-4—Selected components of farm household income by farm sales class, 1997-2001

Item	1997	1998	1999	2000	2001
<i>Dollars per household</i>					
Farm earnings with farm sales of:					
\$9,999 or less	-4,287	-5,664	-4,876	-5,824	-5,755
\$10,000-\$99,999	**1,936	***-345	*1,131	***-630	** -1,365
\$100,000-\$249,999	20,970	22,772	25,596	*13,352	25,321
\$250,000-\$499,999	45,233	59,288	50,553	44,483	37,182
\$500,000-\$999,999	103,501	85,160	87,499	72,808	87,994
\$1,000,000+	307,841	352,411	286,171	281,527	332,494
Total off-farm income with farm sales of:					
\$9,999 or less	50,474	56,870	65,987	65,180	67,892
\$10,000-\$99,999	44,442	51,782	55,534	58,319	55,638
\$100,000-\$249,999	38,852	40,521	31,874	40,016	33,949
\$250,000-\$499,999	34,460	47,252	34,598	39,577	33,011
\$500,000-\$999,999	36,396	30,207	36,452	35,825	30,825
\$1,000,000 or more	36,062	39,143	34,183	44,309	34,731
Earned off-farm income ¹ with farm sales of:					
\$9,999 or less	39,265	42,704	52,740	48,234	52,034
\$10,000-\$99,999	32,911	38,747	39,927	42,820	38,041
\$100,000-\$249,999	22,666	30,139	23,762	27,767	24,433
\$250,000-\$499,999	24,887	31,054	24,020	23,495	18,915
\$500,000-\$999,999	23,051	21,693	25,267	23,365	19,841
\$1,000,000 or more	21,818	21,534	20,350	30,028	21,318

* = Standard error is between 25 and 50 percent of the estimate. ** = Standard error is between 51 and 75 percent of the estimate. *** = Standard error is above 75 percent of the estimate.

¹ Earned income comes from off-farm self-employment or wage and salary jobs.

Source: USDA, Economic Research Service, Agricultural Resource Management Survey, Phase III.

In contrast, households operating farms with less than \$100,000 of sales had significantly higher average off-farm income in 2001 than in 1997. Households with very small farms (sales below \$10,000) reported mean off-farm income, at nearly \$68,000, that was double that reported by households running large farms, and that grew significantly between 1997 and 2001. Households operating farms with sales between \$10,000 and \$99,999 also reported significant growth in mean off-farm income from 1997 to 2001.

Commodity Specialization Affects Off-Farm Earning Opportunities

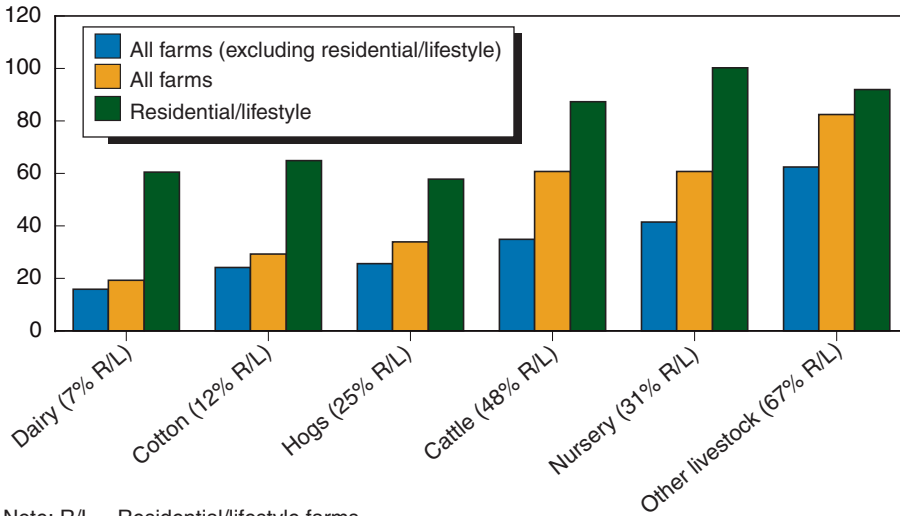
Some commodities are more suited for part-time farming, and off-farm income is more common for households specializing in them. Figure 2-2 compares off-farm income in 2001 for households specializing in each of six major commodities (dairy, cotton, hogs, cattle, nursery, and “other livestock”) and shows how mean off-farm income is affected by the presence of residential/lifestyle farms.

Dairy farming usually requires a large time commitment. Two consequences follow: there are few residential/lifestyle dairy farms (approximately 7

Figure 2-2

Mean off-farm income and share of farms that are residential/lifestyle by commodity specialization, 2001

\$1,000 per household



Note: R/L = Residential/lifestyle farms.

Source: USDA, Economic Research Service, 2001 Agricultural Resource Management Survey, Phase III.

percent of all dairy farms), and the average off-farm income of large dairy farmers is modest. Thus, including residential dairy farms in the calculation does not significantly increase the overall level of dairy farm households' off-farm income. In contrast, cattle raising does lend itself to part-time farming, and overall mean off-farm income for cattle farms increases significantly with the addition of residential/lifestyle cattle farmers. The relatively large size of the residential farmers' off-farm income and the large numbers of such farms in cattle production combine to create this change.

Dairy, cotton, and hog farms exhibit economies of scale and/or labor-intensive production practices. The difficulty of running such large-scale operations or practices requiring such high levels of labor limits successful part-time farming. Residential/lifestyle farmers operated very few of these farms. Instead, they operate many farms engaged primarily in cattle, nursery, or other livestock operations. Nursery farms have an added advantage for part-time farmers: they usually locate in or around large metropolitan areas. Therefore, these farmers have greater access to off-farm labor opportunities than do rural farmers, which helps them to attain higher levels of off-farm income.

Both Operators and Spouses Contribute to Off-Farm Earnings

Do operators take time away from running the farm to generate another source of income? Or do spouses supplement the operator's income by going off the farm to produce an income stream? Or both?

Across all farms, operators earned about 64 percent of all earned off-farm income, while spouses earned almost 33 percent. Therefore, other household members earned about 3 percent, on average. But that breakdown is also driven by the distinctive pattern in residential farms, where spouses—

although they earn more on average than spouses in other categories—earn only 28 percent of mean earned off-farm income compared with nearly 50 percent or higher for other typology groups (table 2-5).

Why do households seek off-farm work? Operators and spouses that worked off the farm were each asked in the 2001 ARMS to specify their 2 main reasons for seeking off-farm employment, from a list of 10 potential reasons. The most common response given by the operator, irrespective of farm type, was to increase the income of the farm household (table 2-5). At least 60 percent of operators in each farm type offered that as the primary reason, with the response rising to 70 percent for operators of farms with sales less than \$100,000.

Table 2-5—Earned off-farm income and selected reasons for working off-farm by farm typology group in 2001

Item	Farm typology				
	Residential/ lifestyle	Farming occupation/ low-sales	Farming occupation/ high-sales	Large	Very large
<i>Dollars per household</i>					
Earned off-farm income ¹					
Household	77,333	17,493	18,788	18,915	20,407
Operator	53,935	7,694	6,331	6,850	10,403
Spouse	21,430	8,525	11,747	11,390	9,349
<i>Percent selecting reason</i>					
Reasons for working off-farm: ²					
Operator reason 1:					
Increase income	71.6	70.8	65.5	61.4	67.3
Health insurance	8.6	d	d	d	d
Operator reason 2:					
Increase income	17.1	15.2	d	d	d
Health insurance	35.6	d	d	d	d
Farm expenses	13.2	31.3	d	d	d
Spouse reason 1:					
Increase income	73.0	58.3	48.6	51.2	57.9
Health insurance	9.8	23.8	24.8	19.6	*17.4
Personal satisfaction	4.2	d	9.5	*15.2	*12.8
Spouse reason 2:					
Increase income	14.2	30.2	27.0	33.3	21.1
Health insurance	32.3	20.7	20.5	21.8	24.7
Personal satisfaction	20.3	21.1	19.4	16.7	24.9
Farm expenses	7.7	11.3	*14.1	d	d

Note: No estimates are shown for limited-resource and retirement farms, due to insufficient observations.

d = Data suppressed due to insufficient observations. * = Standard error is between 25 and 50 percent of the estimate.

¹ Earned income comes from off-farm self-employment or wage and salary jobs.

² Respondents were offered 10 choices: using skills; health insurance; other nonfarm job benefits; increase income; extra time available; diversification of income sources; personal satisfaction; opportunity to get discounts on inputs; cover farm expenses; and repay farm debt.

Source: USDA, Economic Research Service, 2001 Agricultural Resource Management Survey, Phase III.

While spouses primarily offered increased income as the primary reason, again irrespective of farm type, many cited health insurance and personal satisfaction as the primary reason for seeking off-farm employment. All three factors also ranked high on the list of secondary reasons for taking a job off the farm.

Summary and Conclusions

Farm structure is closely related to farm households' off-farm employment. Residential/lifestyle farms, whose operators report a major occupation outside of farming, account for a growing share (nearly half) of all farms, even though they account for a very small share of farm output. The average off-farm earned income of households operating these farms has grown rapidly. This growth may reflect the purchase of small farms by more affluent households, rather than off-farm income growth among continuing farm households.

In contrast, another major group—very large family farms—mostly specializes in farm activities, and draws little or no income from off-farm employment. These farms account for nearly half of all farm output. For the most part, these farmers and their households operate independently of off-farm employment concerns.

Falling between these two groups are family farms whose operators report farming as their major occupation, but whose sales cover a wide range, from \$10,000 to \$1 million a year. Off-farm earned income for households operating these farms, often contributed from jobs held by spouses, provides a significant share of income. Off-farm employment options are closely linked to farm operating decisions for these farmers. For many of the smaller farms in this category—those with sales less than \$250,000—off-farm employment is the primary source of income.

Many of today's farm households allocate their labor (and other resources) between farming and other pursuits, much as nonfarm households allocate their resources among different economic activities. Farm households are often dual-career, with operators and/or spouses combining farm and off-farm work (Hoppe, 2001).

Although this chapter focuses on the flow of income from off-farm sources to operator households, income also flows the other way, from the farm to households other than the operator household (Harrington et al., 1998). The operator households considered in this chapter are the principal operator households, one of which exists for each family farm. However, there are additional households associated with some farms that receive income from the farm business: households of partners (both formal and informal) and those of stockholders in farms organized as corporations (both family and nonfamily). In addition, other nonfarm businesses share income generated by farming. These businesses include nonfarm landlords and nonfarm contractors, both of which generate gross income, pay expenses, and distribute net income to the households that own them. As a result of these reverse income flows, the number of households involved in agriculture is larger than the number of operator households.

Characteristics of Top-Performing Farms

Robert A. Hoppe, Penni Korb, Robert Green, Ashok Mishra, and Carmen Sandretto

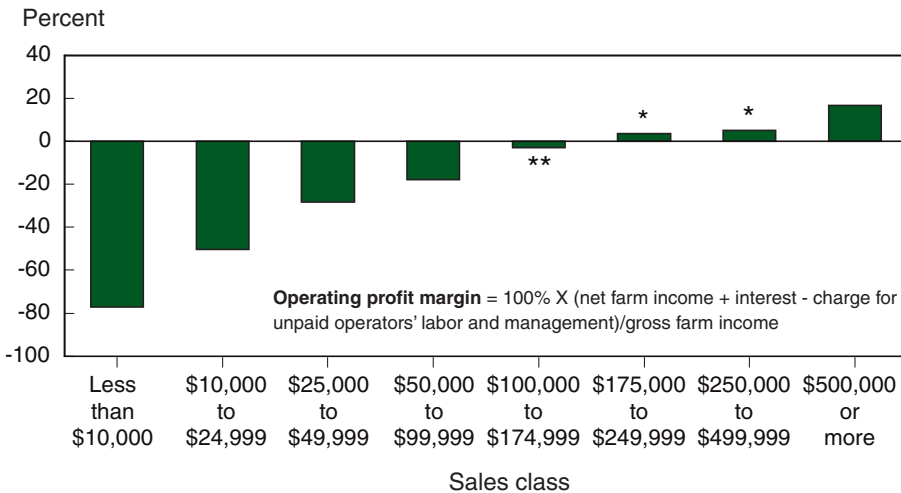
Small farms report poor financial performance on average, but some small farms appear to be viable, small-scale commercial enterprises. This chapter summarizes the financial performance of the farm typology groups, and illustrates the factors associated with top-performing farms. As one would expect, top-performing farms in most of the typology groups have higher gross income per farm and lower costs. Households operating top-performing farms appear to be more aware of the opportunity costs of their resources. They carefully limit their use of owned land and unpaid family labor.

Introduction: Measuring Financial Performance

Smaller farms usually generate lower profits than larger farms, in aggregate. For example, operating profit margins varied inversely with sales in 2001 and were negative until sales reached \$175,000 (fig. 3-1). More than two-thirds of limited-resource and residential/lifestyle farms, and nearly half of retirement and low-sales farms, had negative net cash income in 2001 (table 3-1). At the other extreme, only 13-16 percent of farms with sales of at least

Figure 3-1

Operating profit margin by sales class, 2001
Operating profit margin increases with size



* Standard error exceeds 25 percent but is no more than 50 percent of the estimate.
 ** Standard error exceeds 50 percent but is no more than 100 percent of the estimate.

Sources: Compiled by ERS from the 2001 Agricultural Resource Management Survey, Phase III.

\$100,000—high-sales small farms and large and very large family farms—had negative net cash farm income.

Furthermore, less than one-tenth of those larger farms failed to generate enough gross cash income in 2001 to cover variable expenses, a condition necessary for short-term survival as a commercial enterprise. In contrast, one-third to one-half of the smallest farms—limited-resource, retirement, residential/lifestyle, and low-sales small farms—failed to generate enough cash income to cover variable costs. The year 2001 was not particularly unusual. The same basic patterns prevailed in other recent years.

Nevertheless, some small farms perform well financially in any given year. This chapter examines the characteristics of “top-performing” farms.¹ Poorly performing farms are also examined, to see if they can continue despite their performance. Poor performance does not necessarily imply farm exit, especially for very small farms.²

Table 3-1—Measures of farm financial performance, by farm typology group, 1997 to 2001

Item	1997	1998	1999	2000	2001
	<i>Percent</i>				
Negative net cash farm income, all farms	51.9	54.3	54.1	53.8	54.3
Small family farms:					
Limited-resource	72.2	63.8	56.2	64.6	68.1
Retirement	52.0	60.4	62.7	55.1	49.3
Residential/lifestyle	67.6	67.9	68.8	70.2	72.7
Farming occupation:					
Low-sales	39.5	51.1	48.6	43.4	47.2
High-sales	18.1	18.5	13.7	20.2	15.8
Other family farms:					
Large	12.6	12.4	11.5	15.1	14.4
Very large	*13.9	8.3	10.8	12.6	12.9
Nonfamily farms	44.2	44.1	37.4	36.4	**25.4
Gross cash farm income does not cover variable costs, all farms	38.2	38.8	38.2	38.2	37.6
Small family farms:					
Limited-resource	62.6	50.8	42.1	50.3	40.6
Retirement	41.3	44.7	47.6	39.1	37.5
Residential/lifestyle	51.6	49.8	50.3	51.9	52.8
Farming occupation:					
Low-sales	23.6	36.4	31.0	30.4	31.0
High-sales	7.1	6.1	4.9	6.5	5.6
Other family farms:					
Large	5.7	4.0	4.1	*5.8	4.7
Very large	**6.8	2.8	5.0	4.3	6.1
Nonfamily farms	34.0	28.2	26.7	*22.0	**16.1

Note: The typology groups for 1997 through 2000 are defined in 2001 constant dollars. Sales were adjusted using the Producer Price Index (PPI) for farm products. Household income was adjusted by the Consumer Price Index (CPI). Farm assets were adjusted by changes in the value of farm real estate per acre.

* = Standard error is between 25 and 50 percent of the estimate.

** = Standard error is between 51 and 75 percent of the estimate.

Source: USDA, Economic Research Service, 1996, 1997, 1998 (version 1), 1999, 2000, and 2001 Agricultural Resource Management Survey, Phase III.

¹ Chapter 4 examines the performance of farm businesses based on their efficiency in using inputs to produce output. It also examines the effects of treating the farm household as a business that combines both farm output and off-farm work.

² This chapter examines successful farms in all typology groups. It expands on earlier ERS analyses that assessed limited groupings of farms, such as low- and high-sales farms (Perry and Johnson, 1999); limited-resource, low-sales, and high-sales farms (Mishra et al., 1999b); cash grain farms (Mishra et al., 1999a); or dairy farms (Mishra and Morehart, 2001).

To identify top performers, farms in the 2001 Agricultural Resource Management Survey (ARMS) were first sorted into the more homogeneous groups of the ERS farm typology.³ Farms within each group were then sorted by operator labor and management income (OLMI), and those in each group's highest quartile were designated top-performing farms. Those in the lowest quartile, the "bottom-performing" farms, formed a comparison group.

The proper measure of economic performance is subject to debate among accountants and economists (Mishra et al., 1999a; Mishra and Morehart, 2001). OLMi adjusts net farm income for implicit costs of capital and unpaid labor contributed by family members other than the operator. No charge is made for the operator's unpaid labor; it is included in OLMi as a residual return to the operator. Farm operator households bear implicit, or opportunity, costs for the use of their capital and labor because they forego paid labor returns (income) elsewhere when they contribute work to the farm and the farm foregoes a return (income) on capital used on the farm that could have been earned income in a nonfarm investment. OLMi also reflects decisions concerning choice of farm enterprises, combination of inputs, and other financial and management decisions. The success of farm businesses ultimately depends on how farm operators manage their resources.

We define OLMi as follows:

Net farm income,

Minus: Charge to unpaid labor of nonoperators

Minus: Charge to capital

Equals: OLMi.

Where:

Charge to unpaid labor = [hours of unpaid labor by partners and family members] X [wage rate]

Charge to capital = [net worth] X [return on equity].

Labor hours and net worth are reported in ARMS, but we must estimate the implicit wage rate and return on equity. We use the mean wage earned by farm labor in a State, as reported by NASS each year. The return on equity used here was 1.9 percent, the average return in agriculture estimated by ERS for the 10-year period ending in 2001.

OLMi is a fairly narrow, short-term measure. It does not include longer term benefits, such as potential capital gains from holding farmland. Nor does it include the rural lifestyle that is important to many households operating both large and small farms (see box, "Total Returns From Farming"). Although bottom-performing farms rank low when performance is measured in terms of OLMi, they still may be successful operations when performance is defined more broadly.

³ We use data from version 1 of the 2001 ARMS Phase III, because it collects the most detailed data on the farm operator, farm household, and farm business. Use of version 1 limits our sample to 5,400 farms, and limits the information that can be provided for small subsets of farms, such as limited-resource farms.

Total Returns From Farming

Returns from farming are typically defined narrowly, generally in terms of net income. Operator labor and management income (OLMI)—used in this chapter to measure financial performance—is a net income measure with adjustments for unpaid labor and for capital. There are returns to farming, however, that are not included in net income (Ahearn et al., 2004). In fact, net income is just one component of total returns. Total returns from farming include:

- **Net income from the farm business.** This can be defined in various ways, but all definitions involve subtracting expenses from gross income.
- **Capital gains.** Farming provides operators with an opportunity for capital gains from the eventual sale of farm assets, particularly farmland.
- **Opportunity to make bequests.** Farmers may plan to pass the farm on to their descendents. Like capital gains, bequests occur in the long run.
- **Tax sheltering current off-farm income.** Farm losses can be written off against off-farm income when calculating income tax. The write-off is unlimited, if the farm has the potential to be profitable and the filer is materially involved in running the farm (Freshwater and Reimer, 1995).
- **Psychological benefit (intangible satisfaction) from farming.** Farmers may get satisfaction from farming beyond the net income it provides. For example, farmers may value the rural lifestyle farming provides.

Unfortunately, no existing measures include all the components listed above.

If total returns from farming are considered, a farmer may have negative OLMI most years, but continue farming and still be economically rational. For example, a farmer may have negative OLMI, but anticipate substantial capital gains in the long run and use farm losses in the short run as a tax write-off. Or a farmer may simply enjoy living or working on a farm. Of course, the farmer in this example must have enough off-farm income to absorb any negative cash flow from the farm operation.

OLMI is probably most useful as a performance measure for farming-occupation, large, and very large farms, where getting the highest income, given available resources, is likely to be a major objective of operators and their households. For many retirement and residential/lifestyle farms some of the other factors listed above may be more important, since households operating these farms often have substantial off-farm income.

Ranking farms by OLMI to identify top and bottom performers assumes that the farm business is run independently of any decisions of the farm operator to work off-farm. This assumption is relaxed in chapter 4, when farm efficiency measures are estimated taking account of any off-farm work.

Farm Finances

Top performers use debt and capital (net worth) effectively. In general, top-performing farms tend to generate more gross income per dollar of debt and per dollar of capital (net worth) than do bottom performers (table 3-2). Mean gross cash farm income for top performers generally exceeds that of bottom performers, dramatically so among very large family farms. In addition, top performers tend to maintain lower mean values of debt and net worth than bottom performers. Very large family farms are an exception. Top performers in this group have greater debt and net worth, but because they also have much greater gross cash income, their gross income per dollar of debt or net worth is also much greater.

Table 3-2—Selected financial characteristics, by performance and farm typology group, 2001

Item	Small family farms				Large family farms	Very large family farms	
	Limited-resource	Retirement	Residential/lifestyle	Farming-occupation Low-sales High-sales			
<i>Number</i>							
Farms (or households): ¹							
Bottom-performing	*25,292	61,223	235,735	125,220	41,698	21,815	15,574
Top-performing	*23,471	53,744	234,530	125,055	41,243	21,078	15,543
<i>Dollars per farm</i>							
Gross cash farm income:							
Bottom-performing	*32,719	10,746	15,694	40,382	157,913	319,884	997,190
Top-performing	7,767	17,919	17,989	52,949	194,409	363,625	2,382,546
Farm debt: ²							
Bottom-performing	*22,677	*12,114	53,895	51,949	169,993	284,713	695,169
Top-performing	**2,331	*6,592	*17,055	*30,670	123,757	183,336	790,402
Net worth:							
Bottom-performing	97,384	684,646	456,774	911,053	930,906	1,877,071	2,725,375
Top-performing	*79,968	338,428	236,015	476,601	683,153	1,035,207	3,066,296
<i>Percent</i>							
Ratio of gross cash farm income to farm debt:							
Bottom-performing	*144.3	*88.7	29.1	77.7	92.9	112.4	143.4
Top-performing	*333.2	*271.8	105.5	*172.6	157.1	198.3	301.4
Ratio of gross cash farm income to net worth:							
Bottom-performing	**33.6	*1.6	3.4	4.4	17.0	*17.0	36.6
Top-performing	*9.7	5.3	7.6	11.1	28.5	35.1	77.7
Operating expense ratio: ³							
Bottom-performing	*107.3	150.5	180.6	127.5	100.4	103.8	104.7
Top-performing	*79.3	37.5	63.5	60.6	56.2	57.9	63.8

* = Standard error is between 25 and 50 percent of the estimate. ** = Standard error is between 51 and 75 percent of the estimate.

¹ Bottom-performing farms consist of the bottom 25 percent of farms in a typology group, when farms are ranked from lowest to highest by operator labor and management income (OLMI). Top-performing farms rank in the highest 25 percent of farms. The number of top- and bottom-performing farms are not equal, and each group only approximates 25 percent of all farms in a given typology group. This occurs because whole, weighted observations must be assigned to a quartile.

² Includes short-term loans (original term of 1 year or less), long-term loans (original term more than 1 year), accrued interest, and accounts payable.

³ Operating expense ratio = (total cash operating expenses/gross cash farm income) X 100 percent.

Source: USDA, Economic Research Service, 2001 Agricultural Resource Management Survey, Phase III, version 1.

Top performers also are more likely to have much lower operating expense ratios—the ratio of cash operating expenses to gross cash farm income. Bottom-performing residential/lifestyle farms, for example, use \$1.80 in operating expenses to produce each \$1.00 of gross cash income. In contrast, the top performers in most typology groups use only 60 cents of operating expenses to produce each dollar of gross cash income.

The exceptionally low operating expense ratio for top-performing retirement farms, 38 percent, reflects the large portion of gross income these farms receive from participation in the Conservation Reserve and Wetlands Reserve Programs (CRP and WRP), which require little annual expenditure. Forty-five percent of top-performing retirement farms participate in CRP or WRP, and the programs account for 28 percent of their gross cash farm income. Only 7 percent of bottom-performing retirement farms participate in CRP or WRP, and they receive only 2 percent of their gross cash farm income from the programs.

So far, income and debt have been considered separately. Financial position simultaneously considers a farm’s net farm income and debt/asset ratio. Most top-performing farms in each typology group have a favorable financial position; they have positive net farm income and a debt-to-asset ratio of no more than 40 percent (table 3-3). Over 23 percent of very large top performers, however, are classified as marginally solvent (positive net farm income and a debt/asset ratio higher than 40 percent).

The situation is different for bottom-performing farms. Between 51 and 69 percent, depending on the typology group, fall in the marginal income category, with negative net farm income but low debt/asset ratios. These farms may have low income due to events such as drought, crop or livestock disease, or market conditions. However, 18 to 25 percent of the bottom-performing farms in the residential/lifestyle, high-sales, large, and very large groups are classified as vulnerable, with negative income and debt/asset levels above 40 percent. Business survival may be more problematic for them.

Table 3-3—Financial position,¹ by performance and farm typology group, 2001

Item	Small family farms					Large family farms	Very large family farms
	Limited-resource	Retirement	Residential/lifestyle	Farming-occupation			
				Low-sales	High-sales		
<i>Percent</i>							
Bottom-performing farms:							
Favorable	d	44.3	*12.8	26.4	23.0	d	*19.3
Marginal income	d	55.7	68.9	69.2	51.1	68.8	55.0
Marginal solvency	d	d	d	d	d	d	d
Vulnerable	d	d	*17.8	d	*23.5	20.9	25.2
Top-performing farms:							
Favorable	99.4	100.0	96.1	95.2	83.9	91.7	76.7
Marginal income	d	d	d	d	d	d	d
Marginal solvency	d	d	d	d	d	d	23.3
Vulnerable	d	d	d	d	d	d	d

d = Data suppressed due to insufficient observations. * = Standard error is between 25 and 50 percent of the estimate.

¹ The financial performance classification is based on farm income and the debt/asset ratio:

- Favorable: positive net farm income and debt/asset ratio no more than 40 percent;
- Marginal income: negative net farm income and debt/asset ratio no more than 40 percent;
- Marginal solvency: positive net farm income and debt/asset ratio more than 40 percent;
- Vulnerable: negative net farm income and debt/asset ratio more than 40 percent.

Source: USDA, Economic Research Service, 2001 Agricultural Resource Management Survey, Phase III, version 1.

Employment of Household Land and Labor Resources

Operators of top-performing farms limit their use of household resources, such as owned land and unpaid family labor. Operators do not pay explicit prices for using such resources, and hence may be tempted to overuse them. But land can be rented out or sold, yielding returns that are not captured when the operator farms the land. Family members can work off the farm, bringing in pay foregone when working on the farm. Our OLM measure is designed to account for the implicit costs of using land and unpaid family labor—other than the operator’s—in the farm business.

Land constitutes the bulk of farm assets, so farm debt and net worth often reflect land holdings. In general, top-performing farms use less land than bottom performers. Average acreage operated is actually less—by a statistically significant amount—for top-performing than for bottom-performing farms in the residential/lifestyle, low-sales, and large family farm groups (table 3-4). Top performers in these groups also tend to own and rent fewer acres of land.

The effective use of labor is an important determinant of farm performance. In table 3-5, we report three elements of farm employment: (1) average annual hours worked by the operator; (2) whether the spouse is also an operator, making day-to-day operating decisions; and (3) average annual hours worked on farm by the spouse, regardless of whether the spouse is an operator. Operators of bottom-performing farms report working more hours in all the small family farm groups, and the differences are statistically significant for retirement, residential/lifestyle, and low-sales farms. Also, on small farms with less than \$100,000 in sales (retirement, residential/lifestyle, and low-sales family farms), bottom-performing farms are much more likely to report that spouses also make operating decisions. Finally, in every typology group, spouses in bottom-performing farms work more hours, and the differences are substantial in most cases.

Table 3-4—Farmland, by performance and farm typology group, 2001

Item	Small family farms					Large family farms	Very large family farms
	Limited-resource	Retirement	Residential/lifestyle	Farming-occupation			
				Low-sales	High-sales		
<i>Acres per farm</i>							
Acres operated:							
Bottom-performing	*128	183	235	579	1,264	3,903	3,597
Top-performing	*102	261	136	395	1,035	1,294	2,631
Acres owned:							
Bottom-performing	*18	*160	145	420	*574	*2,279	*1,525
Top-performing	*30	299	96	248	428	503	906
Acres rented in:							
Bottom-performing	*113	*32	97	194	707	1,754	2,104
Top-performing	*78	*14	51	*180	622	812	1,754

* = Standard error is between 25 and 50 percent of the estimate.

Source: USDA, Economic Research Service, 2001 Agricultural Resource Management Survey, Phase III, version 1.

Table 3-5—Farm work performed by farm operators and their spouses, by performance and typology group, 2001

Item	Small family farms				Large family farms	Very large family farms
	Limited-resource	Retirement	Residential/lifestyle	Farming-occupation Low-sales High-sales		
<i>Hours per year</i>						
Hours worked on farm by operator:						
Bottom-performing	*1,894	1,036	1,242	2,384	2,853	2,891
Top-performing	*638	472	607	1,893	2,709	2,751
<i>Percent of spouses</i>						
Spouse is also an operator: ¹						
Bottom-performing	d	45.6	61.6	66.6	43.7	44.6
Top-performing	d	*23.8	34.9	42.8	48.5	41.5
<i>Hours per year</i>						
Hours worked on farm by spouse:						
Bottom-performing	d	281	565	982	987	850
Top-performing	d	*61	90	238	529	579

d = Data suppressed due to insufficient observations.

* = Standard error is between 25 and 50 percent of the estimate.

¹ Responded yes to the question, "Does your spouse (the operator's) also make day-to-day decisions for this farm/ranch?"

Source: USDA, Economic Research Service, 2001 Agricultural Resource Management Survey, Phase III, version 1.

Bottom-performing farms may have suffered unexpected setbacks from weather, disease, or accidents that led to reduced sales as well as increased family labor commitments to the farm. But in general, top performers seem to better manage the use of land and household labor resources. They perform well, in part, because they do not commit their labor and land to activities that provide low returns. On the other hand, some households operating bottom-performing farms may devote more of their resources to farming because they lack viable alternatives.

Organizing the Farm Business

Farmers make several fundamental long-term decisions when designing a business strategy. They choose which products to produce. They also choose a business organization—sole proprietorship, partnership, or corporation—for the farm. Finally, they choose arrangements for selling the farm's products.

Commodity choices appear to be connected to performance in some typology groups (table 3-6). Bottom performers in the retirement, residential/lifestyle, and low-sales farms groups are substantially more likely than top performers to specialize in livestock, largely beef and other livestock (including horses), perhaps in part because their land is less suited for crop production. In addition, beef cattle (particularly cow-calf operations) often require little labor (Cash, 2002) and are compatible with off-farm work and retirement. Among very large family farms, bottom performers are also more likely to specialize in livestock, while top-performing farms frequently specialize in high-value crops (vegetables, fruits and nuts, and nursery and greenhouse crops) and dairy.

Table 3-6—Commodity specialization, by performance and farm typology group, 2001

Item	Small family farms					Large family farms	Very large family farms
	Limited-resource	Retirement	Residential/lifestyle	Farming-occupation			
				Low-sales	High-sales		
<i>Percent</i>							
Specialization, bottom-performing farms: ¹							
Crops	d	41.6	25.9	39.1	58.7	56.6	44.2
Cash grains ²	d	d	10.2	19.0	*21.8	44.4	18.2
Other field crops ³	d	d	13.3	11.3	d	d	10.2
High-value crops ⁴	d	d	d	*8.8	d	d	15.8
Livestock	d	58.4	74.1	60.9	41.3	43.4	55.8
Beef	d	39.3	36.0	43.3	*13.7	18.4	20.7
Dairy	d	d	d	d	20.3	d	*9.2
Poultry	d	d	d	d	d	d	11.7
Other livestock ⁵	d	d	36.1	na	d	d	d
Specialization, top-performing farms: ¹							
Crops	d	59.4	48.9	57.2	51.4	67.4	58.5
Cash grains ²	d	d	*10.8	23.6	*25.1	*30.0	*18.5
Other field crops ³	d	52.7	*31.1	20.4	*17.6	22.9	10.3
High-value crops ⁴	d	d	*7.0	13.2	d	d	29.6
Livestock	d	40.6	51.1	42.8	48.6	*32.6	41.5
Beef	d	32.2	24.4	33.7	*22.3	d	d
Dairy	d	d	d	d	d	d	19.0
Poultry	d	d	d	d	d	d	d
Other livestock ⁵	d	d	d	d	d	d	d

d = Data suppressed due to insufficient observations. * = Standard error is between 25 and 50 percent of the estimate.

** = Standard error is between 51 and 75 percent of the estimate.

¹ Commodity that accounts for at least half of the farm's value of production.

² Includes wheat, corn, soybeans, grain sorghum, rice, and general cash grains, where no single cash grain accounts for the majority of production.

³ Tobacco, peanuts, cotton, sugar beets, sugar cane, corn for silage, sorghum for silage, hay, canola, oats, and general crops, where no single crop accounts for the majority of production. Also includes farms with all cropland in the Conservation Reserve or Wetlands Reserve Programs (CRP & WRP).

⁴ Vegetables, fruits and tree nuts, and nursery & greenhouse.

⁵ Includes sheep, goats, horses, mules, ponies, fur-bearing animals, bees, fish, and any other livestock. Also includes farms where no single livestock species accounts for the majority of production.

Source: USDA, Economic Research Service, 2001 Agricultural Resource Management Survey, Phase III, version 1.

Choice of business organization does not seem to be highly associated with performance within a typology group. The share of farms in each group organized as a partnership or corporation grows significantly with farm size across the typology (table 3-7). But within each group, similar shares of top and bottom performers are organized as partnerships or corporations, with the exception of very large farms, where top performers are more likely to be partnerships or corporations. Top performers among very large farms are much larger, measured in gross cash income, than bottom performers (table 3-2), and the difference in organization likely reflects this.

Contract use is strongly associated with farm size, and farms in the limited-resource, retirement, and residential/lifestyle groups rarely use contracts, regardless of performance. Among very large farms, bottom performers are more likely to use contracts, particularly production contracts. In the remaining groups (farming-occupation small farms and large family farms), top performers are more likely to use contracts (table 3-7). The difference

Table 3-7—Business organization and type of sales, by performance and farm typology group, 2001

Item	Small family farms					Large family farms	Very large family farms
	Limited-resource	Retirement	Residential/lifestyle	Farming-occupation			
				Low-sales	High-sales		
<i>Percent</i>							
Farms organized as partnerships or family corporations:							
Bottom performers	d	*5.7	6.0	*7.4	*17.8	26.5	36.2
Top performers	d	**0.5	*3.6	*8.9	*17.7	24.4	54.8
Farms by type of sales, bottom performers:							
Cash sales only	97.7	96.6	97.5	91.9	74.6	68.9	44.8
Contracts (with or without cash sales) ¹	d	d	*2.5	8.1	25.4	31.1	55.2
Production contracts	d	d	d	*0.8	**6.0	13.8	25.1
Marketing contracts	d	d	d	7.4	21.3	19.3	34.5
Farms by type of sales, top performers:							
Cash sales only	96.3	92.8	94.3	84.4	66.8	43.9	53.9
Contracts (with or without cash sales) ¹	d	*7.2	*5.7	15.6	33.2	56.1	46.1
Production contracts	d	d	d	**0.8	d	*10.7	*5.8
Marketing contracts	d	d	d	15.3	d	47.9	41.9

d = Data suppressed due to insufficient observations.

* = Standard error is between 25 and 50 percent of the estimate.

** = Standard error is between 51 and 75 percent of the estimate.

¹ The categories "production contracts" and "marketing contracts" are not mutually exclusive. Farms may have both types of contracts.

Source: USDA, Economic Research Service, 2001 Agricultural Resource Management Survey, Phase III, version 1.

between top and bottom performers in these remaining groups is strongly statistically significant only for large farms, particularly in the case of marketing contracts. Differences between top- and bottom-performing farms may reflect differing commodity orientations of the performance groups, particularly for very large farms.

Operator Household Income

The level and sources of household income (see Appendix II, "Measuring Farm Operator Household Income") vary widely across typology groups and between top and bottom performers within a given typology group (table 3-8). Regardless of farm size, however, farm earnings make a positive contribution to average household income for top performers. Depending on the typology group, between 59 and 99 percent of top-performing households have positive household income, with a positive contribution from farming. In contrast, average farm earnings are negative for bottom performers, as one would expect.

The contribution of farm earnings is particularly large for households operating high-sales farms, large family farms, and very large family farms. Mean household income for top performers in each of these groups far exceeds that of bottom performers, and farm earnings account for most of household income. Bottom performers in each category have large losses from farming, and those losses far exceed off-farm income for the two largest farm groupings.

Table 3-8—Operator household income, by performance and farm typology group, 2001

Item	Small family farms					Large family farms	Very large family farms
	Limited-resource	Retirement	Residential/lifestyle	Farming-occupation			
				Low-sales	High-sales		
<i>Dollars per household</i>							
Mean household income:							
Bottom-performing	*5,686	*53,503	99,936	28,498	**9,918	d	*-90,256
Top-performing	8,196	52,476	73,549	48,452	101,287	148,584	683,458
Farm earnings:							
Bottom-performing	*-7,607	-9,201	-17,780	-21,474	*-18,304	-58,931	*-130,222
Top-performing	d	9,308	*4,536	15,631	69,762	121,098	651,325
Off-farm income:							
Bottom-performing	*13,294	*62,704	117,716	49,972	28,222	49,085	39,966
Top-performing	*7,620	43,168	69,013	32,821	31,525	27,485	32,133
<i>Percent</i>							
Share of off-farm income from earned sources: ¹							
Bottom-performing	71.2	*17.7	89.3	45.9	71.4	53.1	58.3
Top-performing	**58.6	*11.2	89.3	44.0	65.7	54.7	59.5
Dependence category:							
Positive household income, loss from farming:							
Bottom-performing	d	84.7	89.2	56.9	*19.7	23.9	12.5
Top-performing	d	d	*40.3	16.8	d	d	d
Positive household income, gain from farming:							
Bottom-performing	d	d	*9.0	18.0	*38.9	28.2	30.7
Top-performing	d	83.5	59.3	78.3	94.5	99.1	97.5
Negative household income:							
Bottom-performing	d	d	d	25.1	41.4	48.0	56.7
Top-performing	d	d	d	d	d	d	d

d = Data suppressed (insufficient observations); * = Standard error is 25 to 50 percent of the estimate; ** = Standard error is 51 to 75 percent of the estimate.

¹ Earned income comes from off-farm self-employment or wage and salary jobs. Unearned income includes interest and dividends, benefits from Social Security and other public programs, alimony annuities, net income of estates or trusts, and private pensions.

Source: USDA, Economic Research Service, 2001 Agricultural Resource Management Survey, Phase III, version 1.

Nevertheless, bottom performers' losses from farming do not necessarily result in low household income. Bottom-performing residential/lifestyle farms lose an average of \$17,800, about as much as bottom performers in the low- or high-sales groups (table 3-8). Yet, bottom performers' off-farm income in the residential/lifestyle group exceeds that of top performers by \$48,700. High off-farm income—largely from earned sources—more than compensates for their farm losses.

Households operating bottom-performing retirement farms are another case where farm losses do not translate into low household income. Because of their off-farm income—largely from unearned sources—bottom performers in the retirement group receive a mean household income about the same as that of top performers. The ability to write off farm losses against other income when paying taxes (Freshwater and Reimer, 1995) may be particu-

larly useful to households operating bottom-performing retirement and residential/lifestyle farms.

Operator Characteristics: Age and Education

Few differences in age or education exist between operators of top- and bottom-performing farms (table 3-9). Top-performing operators of very large farms, however, tend to be younger than their bottom-performing counterparts. Average age for top performers in the group is 48 years, versus 51 years for bottom performers, and a larger share of top performers is younger than 55. Top performers also average 7 years less in experience as a farm operator.

Table 3-9—Age and educational characteristics of operators, by performance and farm typology group, 2001

Item	Small family farms					Large family farms	Very large family farms
	Limited-resource	Retirement	Residential/lifestyle	Farming-occupation			
				Low-sales	High-sales		
<i>Years</i>							
Average age of operator:							
Bottom-performing	41	69	50	60	52	52	51
Top-performing	50	71	51	59	49	50	48
Average experience as operator:							
Bottom-performing	*12	32	17	30	23	26	29
Top-performing	*30	35	18	30	23	27	22
<i>Percent</i>							
Age of operator, bottom-performing farms:							
Younger than 45 years	d	d	32.6	13.6	18.7	*25.6	31.4
45 to 54 years	d	d	40.7	22.5	36.9	36.2	36.3
55 to 64 years	d	d	18.9	25.3	*32.7	20.8	22.0
65 years or more	d	74.3	d	38.6	11.7	17.4	10.3
Age of operator, top-performing farms:							
Younger than 45 years	d	d	*22.5	20.3	40.9	36.1	37.9
45 to 54 years	d	d	*43.0	19.2	21.3	29.1	41.6
55 to 64 years	d	d	26.6	19.2	27.8	*23.9	13.8
65 years or more	d	77.1	d	41.4	d	d	6.7
Education of operator, bottom-performing farms:							
Some high school or less	d	d	d	21.8	d	d	d
Completed high school	d	41.0	27.8	39.5	42.6	41.2	36.1
Some college	d	d	35.5	20.9	24.2	32.2	31.2
Completed college	d	d	29.9	17.8	*17.1	26.3	26.6
Education of operator, top-performing farms:							
Some high school or less	d	d	d	22.3	d	d	d
Completed high school	d	36.0	54.2	38.1	40.7	55.1	23.0
Some college	d	d	*17.9	23.4	22.0	*25.7	41.2
Completed college	d	d	*20.3	16.2	21.0	16.1	30.0

d = Data suppressed due to insufficient observations. * = Standard error is between 25 and 50 percent of the estimate.

Source: USDA, Economic Research Service, 2001 Agricultural Resource Management Survey, Phase III, version 1.

Top performers operating very large farms tend to have higher educational achievement. Seventy-one percent of top performers have at least some college—with or without a degree—compared with only 58 percent of bottom performers. Formal education does not seem to be as closely associated with performance for the other commercial-sized farms: large family farms and high-sales small farms. In addition, only 38 percent of the operators of top-performing residential/lifestyle farms have college exposure, compared with 65 percent of bottom-performing operators. The higher educational levels of bottom performers in this group may contribute to their higher off-farm income.

Performance and Business Survival

Do poorly performing farms stay in business? We use data from the Census of Agriculture 1978-97 Longitudinal File (see Appendix I, “Sources of Data”) to answer this question. The longitudinal file merges data from separate censuses, and allows us to follow individual farms over a 20-year period.

Each census of agriculture collects detailed information, including production expenses, from a sample of farms, in addition to the government payments and sales data collected from all farms. Thus, it is possible to calculate a crude net farm income estimate (gross sales + government payments – production expenses) for a sample of farms each census year. Some farms—by chance—are in the detailed sample in consecutive censuses, so the longitudinal file can be used to trace some farms with 1997 losses back to the 1987 census, when detailed expense data and information about government payments were first collected.

About 35,200 farms with a loss in 1997 are also in the sample in both 1992 and 1987. We trace their experience in figure 3-2, which shows information for all these farms, those with 1997 sales below \$10,000, and those with sales above \$10,000. For each category, the figure shows the share of farms with losses in 1992, 1987, and both years.

Over 47 percent of sample farms with losses in 1997 also reported losses in a previous census year. Persistence of losses, however, varies significantly with farm size. Among very small farms (less than \$10,000 in sales), 68 percent recorded losses in at least one previous census, and 33 percent recorded losses in both 1992 and 1987. In contrast, only 8 percent of farms with sales of \$10,000 or more lost money in both previous years, and almost 62 percent did not record a loss in 1992 or 1987.

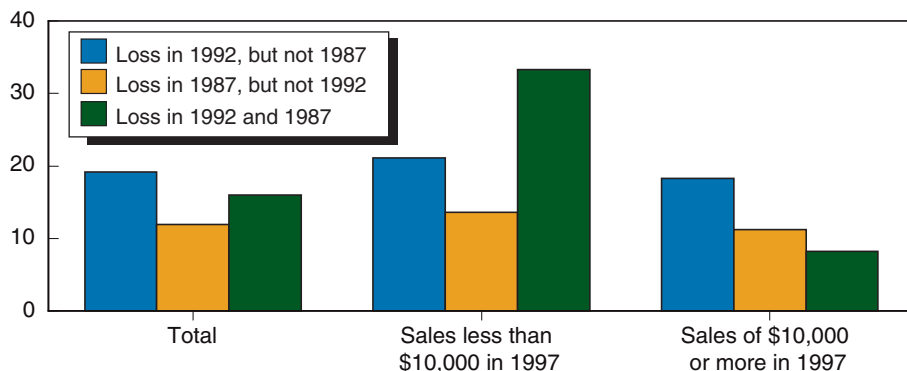
Many very small farms lose money, and they lose money persistently, with farm activities financed from off-farm income. Farmers may decide to continue farming, despite losses, because they value returns from farming other than net income (see box, “Total Returns From Farming,” p. 34). For example, operators of limited-resource, retirement, and residential/lifestyle farms report that a rural lifestyle is more important than the farm providing an adequate household income without off-farm work (fig. 3-3). In contrast, operators in the remaining typology groups tend to rank these goals more equally.

Figure 3-2

Farms with a loss in 1997 that existed in 1987, by sales class and loss in 1992 and 1987

Farms can persist, despite a history of losses

Percent of farms reporting loss in 1997



Note: Based on farms that were drawn for sample data collection in 1997, 1992, and 1987.

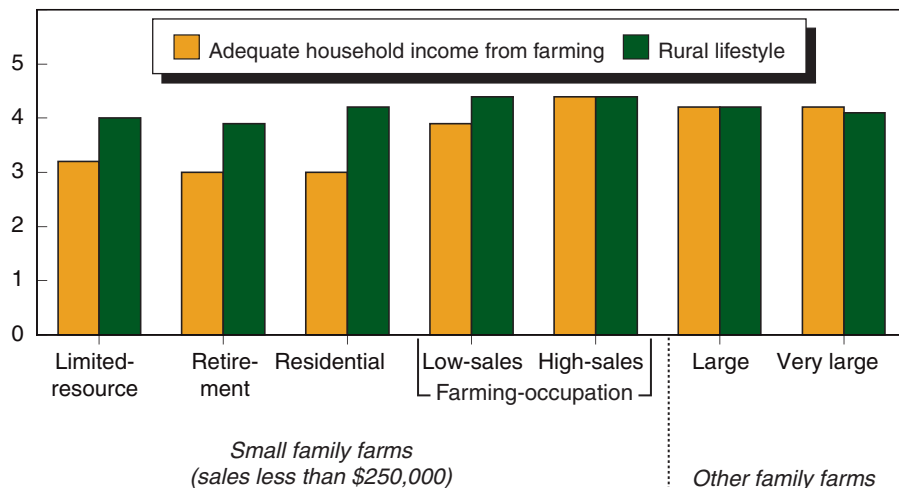
Sources: USDA, National Agricultural Statistics Service, Census of Agriculture Longitudinal File.

Figure 3-3

Mean scores for selected goals by typology group, 2000

All farmers value a rural lifestyle, but an adequate income from farming is most important to those operating farms with sales greater than \$100,000

Mean score



Note: 1 = Very unimportant
 2 = Unimportant
 3 = Neutral
 4 = Important
 5 = Very important

Source: USDA, Economic Research Service, 2000 Agricultural Resource Management Survey, Phase III, version 1.

Summary and Conclusions

Operator characteristics, business organization, and contracting do not seem to be strongly related to performance in most typology groups. Still, operators of top-performing very large farms are younger and have more formal education than bottom performers in that group, and their farms are more likely to be partnerships or family corporations. These differences, however, are most likely related to the exceptionally large size—measured in gross cash income—of top-performing farms in the very large group. Similarly, the relationship between performance and contracting is not clear. Top performers in the very large group are less likely to have contracts (especially production contracts), while top performers in the large group are more likely to have contracts (especially marketing contracts).

For other characteristics, there are significant differences between top and bottom performers. For example, top performers in four typology groups (retirement, low-sales, large, and very large) are more likely to specialize in crops, although top performers in the very large group often specialize in dairy. Top-performing farms in most of the typology groups have higher gross income per farm and control their costs better, as reflected in the lower average operating expense ratio for these farms. This is not a particularly new finding. For example, Warren and Burritt, in a 1909 study based on a survey of 178 New York farms (cited in Bergen et al., 1990), found that the more profitable farms had higher revenue and better controlled their cash expenses. There are few other consistent, systematic differences between the two performance groups that explain the success of top performers.

In most of the typology groups, however, top performers report lower debt and/or net worth, on average, and use less unpaid labor. Lower debt contributes to the higher share of top performers with a favorable financial position in each group. Lower net worth also contributes to the higher operator labor and management income (OLMI) of top performers, since a deduction is made for the opportunity cost of capital in the calculation of OLMIs and it helps explain why top-performing farms frequently own (and operate) less land than bottom performers. The charge for unpaid household labor may explain why the spouse works less on the farm on top-performing farms. Households operating top-performing farms apparently are more aware of the opportunity costs of their capital and labor.

Top-performing farm households are more likely than bottom-performing households to have a positive household income, with a positive contribution from farming. This does not mean, however, that off-farm income is inconsequential to households operating top-performing farms. Even households operating top-performing large and very large family farms receive around \$30,000, on average, from off-farm sources. For top-performing households in the retirement, residential/lifestyle, and low-sales groups, average off-farm income exceeds farm earnings by a substantial margin. Farms in these typology groups, even if run effectively, are generally too small to generate enough income to support a household comfortably.

In most typology groups, top performers' total household income exceeds that of the corresponding bottom-performing groups. This is not the case,

however, for the retirement and residential/lifestyle groups. In these groups, bottom performers use off-farm income to finance losses from farm operations. The U.S. tax code allows farmers to write off farm losses against other income. There is no limit to the writeoff, as long as the farm has the potential to be profitable and the filer is materially involved in running the farm (Freshwater and Reimer, 1995).

Top-performing farms are likely to continue in business, for they covered operating expenses and contributed to the operator household's income. A direct connection between poor farm performance in 2001 and farms going out of business is more difficult to establish. At least some of the bottom-performing farms may have simply had a poor year in 2001. If their farm income improves in later years, they are likely to continue in business.

In addition, some small farms—particularly in the retirement and residential/lifestyle groups—could be bottom performers for years and still continue in business. Households operating these farms may be willing to absorb losses to meet goals other than a profitable farm, such as eventual capital gains, the ability to pass the farm on to descendants, sheltering off-farm income from taxes, and a rural lifestyle. Although small farms are more likely to leave farming (Hoppe and Korb, 2001), many continue in business as long as the operator households have other sources of income, farm losses are not unduly large, and favorable tax treatment of farm losses continues.

Farm Size, Efficiency, and Off-Farm Work

Richard Nehring

Very large commercial farms have important cost advantages over smaller farms in the major corn and soybean producing States. Those advantages, however, do not appear to promote further expansion of the largest farms—scale economies (the decline in cost per unit of output as output increases) appear to be fully realized by the largest current farms. Off-farm earnings opportunities may affect how we view both scale economies and farm technical efficiency (how effectively inputs are used in producing output). When the off-farm income that an operator foregoes by expanding is taken into account, the gains from expanding are lower.

Introduction

This chapter examines how two measures of farm production efficiency vary across farms in 10 States (Illinois, Indiana, Iowa, Michigan, Minnesota, Minnesota, Nebraska, Ohio, South Dakota, and Wisconsin) that account for most U.S. corn and soybean production, and shows how these measures vary with farm size and across farms of a given size.

The influence of off-farm work is explicitly included in these measures of performance.¹ Off-farm income and nonfarm business opportunities have become increasingly important in many agricultural areas in recent years. Off-farm income accounts for almost all household income (see Appendix II, “Measuring Farm Operator Household Income”) among households with less than \$100,000 in farm sales, and smaller but still important shares of income among most households with more than \$100,000 in farm sales. The analysis views the farm household as a business that combines both farm outputs and off-farm work. For example, when the household plans an expansion of the farm business, it explicitly takes into account the effect of that expansion, which would require more onfarm work by household members, thereby reducing off-farm earnings opportunities.

Two measures of relative efficiency (stated in terms of inefficiency) are used (Nehring et al., 2002). The first measures scale inefficiency. Frequently, production is subject to economies of scale, in which costs per unit of output decline as output grows. When there are potential economies of scale, they should be most noticeable and have greater impacts on costs among smaller operations—that is, at least some farms would be expected to get big enough to realize available economies of scale. The growth in the number of very large farms and the decline in the number of small commercial farms is likely due in part to these economies.

¹ Chapter 3 examines the characteristics of “top” and “bottom” performing farms based on a financial measure of farm business performance, the returns to operator labor, and management income.

The scale inefficiency measure reported here indicates the percentage decline in unit costs for every 1-percent increase in farm output. Hence, a value of 0.2 indicates that unit costs would decline by 0.2 percent for a 1-percent increase in output. A value of 0.0 indicates that unit costs would not change as farm size increased.

The second measure of inefficiency is technical inefficiency. Among farms of a given size, it is not uncommon to see a noticeable variation in costs. Some farms follow “best practices.” They realize much lower costs than other operators by using technologies and techniques that best fit the farm’s outputs and resource base. The technique used here isolates the best-practice farms within any size class, and measures technical inefficiency by how far other farms fell, on average, below best-practice farms. Specifically, an index of technical inefficiency is defined and set equal to 0 for best-practice farms. For other farms, the index measures the extent to which costs exceed a best-practice farm of the same size. For example, a farm with a technical inefficiency index of 10 realizes costs that are 10 percent greater than a best-practice farm with the same level of output.

Data from ARMS (see Appendix I) for 5 years (1996, 1997, 1998, 1999, and 2000) were used to analyze these measures. Representative farms were defined by assigning sample farms in the 10 States to 1 of 13 groups, classified by the primary occupation of the farm operator and the gross sales of the farm (table 4-1). Data for the representative farms were then developed by calculating mean data values for all the sample farms within each group. A total of 650 representative farms were used in the analysis (13 representative farms in each of 10 States for each of 5 years). Assigning farms to

Table 4-1—Defining farm groups

Farm group	Farm typology category	Gross value of sales
<i>Rural residence farms</i>		
1	Limited-resource, Retirement, & Residential/lifestyle	\$2,499 or less
2	Limited-resource, Retirement, & Residential/lifestyle	\$2,500-\$29,999
3	Limited-resource, Retirement, & Residential/lifestyle	\$30,000-\$249,999
<i>Intermediate farms</i>		
4	Farming occupation-Low Sales	\$9,999 or less
5	Farming occupation-Low Sales	\$10,000-\$29,999
6	Farming occupation-Low Sales	\$30,000-\$99,999
7	Farming occupation-High Sales	\$100,000-\$175,000
8	Farming occupation-High Sales	\$175,000-\$249,999
<i>Commercial farms</i>		
9	Large family farms	\$250,000-\$330,000
10	Large family farms	\$333,001-\$410,000
11	Large family farms	\$410,001-\$499,999
12	Very large family farms and Nonfamily farms	\$500,000-\$999,999
13	Very large family farms and Nonfamily farms	\$1,000,000 or more

Source: USDA, Economic Research Service farm typology categories (see "Introduction" for further discussion).

groups and then developing a representative farm for each group greatly simplifies the task of statistical estimation.

Large Farms Have Important Cost Advantages

Statistical techniques were used to estimate measures of scale and technical inefficiency. The analysis controlled for other characteristics of the farm operation, such as the mix of commodities produced on the farm and input prices, and also controlled for characteristics of the farm operator and the operator's household, including age, education, experience, and off-farm work.

Based on the analysis, measures of scale inefficiency could be developed for farms in each group (these are mean estimates across years and States). Results (table 4-2) suggest that scale economies were pervasive and important. Among the smallest rural residence farms, the reported scale inefficiency measure is 0.43—costs per unit of output fall by 4.3 percent for every 10-percent increase in sales. This measure declines as rural residence farms get larger, as it should. But it is still quite large for farms with sales of \$30,000-\$249,999.

Groups 4 through 8 cover intermediate farms, small farms whose operators report farming as their major occupation. The number of these farms is

Table 4-2—Measures of efficiency for different farm types and sizes

Group number	Farm type and sales range ¹	Scale inefficiency ²	Technical inefficiency ³
<i>Measure</i>			
<i>Rural residence</i>			
1	\$2,499 or less	0.43	5
2	\$2,500-\$29,999	0.33	4
3	\$30,000-\$249,999	0.22	5
<i>Intermediate</i>			
4	\$9,999 or less	0.32	5
5	\$10,000-\$29,999	0.28	5
6	\$30,000-\$99,999	0.19	5
7	\$100,000-\$175,000	0.13	5
8	\$175,000-\$249,999	0.11	5
<i>Commercial</i>			
9	\$250,000-\$330,000	0.07	5
10	\$333,001- \$410,000	0.05	5
11	\$410,001-\$499,999	0.05	5
12	\$500,000-\$999,999	0.06	4
13	\$1,000,000 or more	0.02	5

¹ Operators of rural residence farms do not report farming as their major occupation, while operators of intermediate farms do. Commercial farms include all farms with sales of at least \$250,000, regardless of occupation reported by the operator.

² The percent by which average costs per unit of output would decrease if output increased by 1 percent. For example, for representative farms in group 8, average per unit costs would decrease by 0.11 percent for a 1-percent increase in output.

³ The percent by which average costs for all representative farms in a group exceed those of the most efficient representative farm in that group for a fixed level of output. For example, in group 8, farms on average have costs that are 5 percent higher than the most efficient farm in the group.

Source: Estimates based on data obtained from the Agricultural Resource Management Survey, Phase III, USDA, Economic Research Service.

declining (table 1-1, p. 9)², and table 4-2 suggests one important reason for their decline—they can, on average, realize much lower costs by expanding output. Farms with sales between \$10,000 and \$30,000 have an average scale inefficiency of 0.28 (unit costs fall by 2.8 percent for every 10-percent increase in output), while farms with sales between \$30,000 and \$100,000 have a lower but still significant estimate of 0.19.

Estimates of scale inefficiency for commercial farms are much lower and approach zero among the largest farms, those with sales of \$1 million or more. The number of farms with sales between \$250,000 and \$500,000 remained stable after 1992, while the number of farms with sales in excess of \$1 million grew rapidly. Those largest farms have small but economically significant cost advantages over other commercial farms.

Measures of technical inefficiency are quite consistent across groups, and fall in a range of 4 to 5 percent. On average, the most efficient representative farms have unit costs that are about 5 percent lower than similarly sized farms in other States or years. However, much of the variation in technical inefficiency across individual farms was removed in the data development process, as individual farm data were averaged to create representative farms.

The analysis took explicit account of off-farm work in developing performance measures, and that decision had an important impact on the estimates. Inefficiency measures were much larger when off-farm work was excluded. For example, the scale inefficiency measure increased from 0.02 to 0.18 for the largest group, when off-farm work choices were excluded. That estimate would suggest that even some of the largest farm businesses were too small to fully realize all scale economies. But off-farm work options make farm expansion more costly, since expanding the size of the farm would require households to give up some off-farm work and its associated income. When these factors are properly taken into account in evaluating farm expansion, the gains to expansion of the largest farms become minimal, and the analysis provides a logical explanation for recent structural changes in farming.

² Correspondence between intermediate farms and farms with sales less than \$250,000 in table 1-1 is not exact, because table 1-1 does not consider occupation.

Agricultural Use of Production and Marketing Contracts

James M. MacDonald and David E. Banker

Production and marketing contracts governed about 36 percent of the value of U.S. agricultural production in 2001, compared with 28 percent in 1991. Contracts now govern much of the production of a few commodities, including broilers, hogs, sugar beets, processing tomatoes, and tobacco, but a relatively small share of others such as corn, soybeans, and wheat. The use of contracts for individual commodities can expand quite rapidly. Contracts covered two-thirds of hog production in 2001, up from one-third just 5 years before. Virtually nonexistent in tobacco marketing in 1999, contracts covered half of 2001 production. Large farms use contracts much more than other farms.

Farmers have long used formal contracts when obtaining land, credit, and equipment, and also when organizing the production and marketing of some farm commodities, such as vegetables for processing. However, formal commodity contracts cover a growing share of agricultural production. Commodity contracts governed about 36 percent of the value of U.S. agricultural production in 2001, versus 28 percent in 1991. Aggregate data indicate slow but steady growth in contract use in agriculture. But aggregate data can mask changes in some sectors; for example, in just a few years contracting became the primary method of organizing transactions in hog production and in tobacco marketing.

The use of contracts varies widely by commodity. Contracts govern much of the production of broilers, hogs, sugar beets, processing tomatoes, and tobacco, while a combination of contracts and vertical integration dominates turkey and sugar cane production. Contracting covers a substantial share of the production of cotton, rice, and peanuts, but a much smaller share of traditional field crops such as corn, soybeans, and wheat. Larger farms are far more likely to use contracts than smaller farms, and the growth of these farms has contributed to the increased share of production governed by contracts.

What Are Agricultural Commodity Contracts?

Contracts governing the production of agricultural commodities can be broadly classified as marketing contracts or production contracts.

Marketing contracts usually set a price (or pricing mechanism) and an outlet for the commodity, under agreements set before harvest or, for livestock, before the livestock is ready to be marketed. The pricing mechanisms often limit a farmer's exposure to wide price fluctuations, and the contracts often specify product quantities and delivery schedules. The farmer retains

substantial control over major management decisions since the farmer maintains ownership of the commodity and provides all inputs used during production, with limited direction from the contractor.

Production contracts detail specific farmer and contractor responsibilities for provision of necessary production inputs and practices. For example, the farmer provides labor, equipment, and housing under many livestock production contracts, while the contractor provides feed, veterinary and transportation services, and young animals. Production contracts often specify particular inputs, set production guidelines, and allow for contractor technical advice and field visits, leaving the farm operator with less control over input choices. Compensation is often a fee for service, with the farmer's payment based on input costs, the quantity of production, or both. Contractors, not farmers, often retain ownership of the commodity during production. Because of the nature of the agreement, production contracts are finalized before the farmer commences production of a commodity.

Why Are Contracts Used?

Contracts offer potential benefits to both buyers and sellers of agricultural commodities. Farmers can obtain a guaranteed market for their production with a known price or pricing system. Buyers can obtain an assured and timely supply of product with desired attributes.

Contracts Can Provide Risk Sharing

Farmers face several different kinds of business risks. They face yield risks. Favorable weather may lead to unusually large crops, while bad weather may reduce the amount of a crop that can be sold. Bad weather may cause animals to put on weight more slowly or to suffer high mortality rates, while good weather may lead to faster and larger weight gains and increased meat production.

Farmers also face price risks. Spot market producers have little control over commodity prices, which can fluctuate widely over time. Forces broadly affecting supply lead to price changes. On the other hand, forces narrowly affecting individual farmers' production, costs, or product quality may not cause market prices to change, but may significantly affect farmers' financial condition. Unexpected market developments may raise or lower prices substantially above or below the price that a farmer expected when making production decisions. Farmers may also face risks from fluctuations in prices for inputs, such as fertilizers or feeds.

Price and yield risks combine to produce income risks. Some contracts limit the income risks faced by farmers by shifting price and (sometimes) yield risks to processors and other market participants who are better positioned to bear risks, and in some cases by controlling and thereby reducing risks.

However contracts can also introduce a new set of strategic risks for farmers. For example, once a farmer has contracted to produce a crop or

livestock variety that is specific to the needs of a single buyer, the farmer faces risks of failure by the buyer/contractor, with attendant risks to market access and payment and the potential loss of investment in highly specialized equipment and facilities. The farmer also faces the risk of harvesting crops or producing animals that fall below contracted quality or quantity requirements—with subsequent penalties for noncompliance.

Buyers Get Assured Supply With Desired Attributes

Contracts can reduce farmer risks, but that does not appear to be the primary reason for their growth. Contracts can reduce processor costs by ensuring large and steady flows of uniform agricultural products. Moreover, buyers are increasingly demanding products with specific product or production process attributes. A product attribute would be high-oil corn that has specific nutritional characteristics, while a production process attribute would be milk produced according to organic standards.

Producers may not be able to store perishable products such as tomatoes until the processor is ready to accept the harvest, and processors may not be able to test for specific attributes (such as freedom from pesticide residues) and still have the crop at peak freshness. In such cases, contracts may help firms procure specific attributes by specifying production, harvest, and/or marketing practices. Farm inspections are often used to monitor compliance with these practices. Processors obtain desired attributes through contractual control of practices instead of post-harvest testing and measurement in spot markets.

Buyers are increasingly interested in identity-preserved products, such as organically produced commodities or specialty grains, with attributes that are kept segregated throughout the marketing chain. Identity preservation requires substantial investments in testing, monitoring, and physical separation, and contracts may reduce those costs by controlling production and harvesting practices and by requiring investments in information and measuring at the stages where they are most effective. Again, attribute certification would be met through contractual control and onsite inspection of practices, rather than through producer provision of information and warranties.

Use of Contracts Is Related to Farm Size

While 36 percent of the value of all agricultural commodity production was carried out under a production or marketing contract in 2001, the use of contracts varied widely across the collapsed farm typology groups (see box, “Collapsed Farm Typology Group Definitions”).¹ For example, contracts governed 42 percent of production value on commercial farms, versus 24 percent and 13 percent on intermediate and rural residence farms (table 5-1). Contracting is more important among larger commercial farms: those with sales above \$500,000 are more likely to have a contract, and to have more of their production under contract, than those with sales between \$250,000 and \$500,000 (table 5-2).

¹ The collapsed typology was developed by USDA (see U.S. Dept. of Agriculture, Sept. 2001) to facilitate comparisons between three groups of farms that differ in farm business and other characteristics.

Collapsed Farm Typology Group Definitions

The collapsed typology combines farms from the eight typology groups (see box, “Farm Typology Group Definitions,” p. 2) into three groups:

Rural residence farms

- Limited-resource farms
- Retirement farms
- Residential/lifestyle farms

Intermediate farms

- Farming-occupation/low-sales farms
- Farming-occupation/high-sales farms

Commercial farms

- Large family farms
- Very large family farms
- Nonfamily farms

Table 5-1—Production value and contract use by farm typology group, 2001

Item	Rural residence farms	Intermediate farms	Commercial farms	All farms
<i>Percent within group</i>				
Farms with contracts	3.6	16.0	41.7	11.0
Production value under contract	13.3	24.2	42.2	36.4
<i>Percent across all farms</i>				
Farms with contracts	19.6	44.6	35.8	100.0
Production value under contract	2.3	14.4	83.2	100.0
All farms	59.8	30.7	9.5	100.0
Value of production	6.4	21.7	71.8	100.0

Source: USDA, Economic Research Service, 2001 Agricultural Resource Management Survey, Phase III.

Table 5-2—Use of contracts by farm size in 2001

Farm size (gross sales)	Farms with contracts	Value of production under contract
<i>Percent</i>		
Less than \$250,000	7.7	19.1
\$250,000-\$499,999	47.9	31.2
\$500,000-\$999,999	60.9	45.7
\$1,000,000 or more	61.5	46.6

Source: USDA, Economic Research Service, 2001 Agricultural Resource Management Survey, Phase III.

Contracts Cover a Growing Share of Agricultural Production

Large farms use contracts much more than other farms, and in the last two decades, large farms have handled large and rapidly growing shares of agricultural production (Hoppe and Korb, 2002). From 1991 to 2001, the share of the largest farms (sales of \$500,000 or more) and their corresponding shares of production and contract production have grown (table 5-3).² The share of farms with sales of at least \$1 million (in 2001 dollars) doubled (from 0.6 to 1.2 percent) by the end of the decade. Since the aggregate number of farms remained fairly stable over time, the percentage growth in farm numbers matched the growth in share. In turn, farms with annual sales below \$250,000 accounted for a declining share of total and contract production value, while farms with \$1 million or more in sales (2001 dollars) accounted for an increasing share, particularly in recent years.

Contracts covered about 12 percent of production value in 1969, increasing to 28 percent in 1991 and 36 percent in 2001 (fig. 5-1).³ The share of farms using contracts grew more slowly, from 6 percent of farms in 1969 to 11 percent in 2001. While the share of production covered by **production** contracts grew from 10 percent of the value of production in 1978 to 16 percent in 2001, the share of farms with production contracts remained stable, at about 2 percent (fig. 5-2).

The share of farms using marketing and/or production contracts remained relatively constant during 1991-2001 (fig. 5-3) (table 5-4). The growth in the share of the value of production under contract was largely attributable to increases in contract activity for livestock, particularly hogs.

Table 5-3—Distribution of U.S. farms and production by farm size, 1991-2001

Farm size (gross sales)	1991-93	1994-95	1996-98	1998-2000	2001
<i>Percent of farms</i>					
Less than \$250,000	94.3	93.8	93.2	92.7	92.7
\$250,000-\$499,999	3.7	3.7	4.1	4.1	4.0
\$500,000-\$999,999	1.4	1.5	1.7	2.0	2.2
\$1,000,000 or more	0.6	0.9	0.9	1.2	1.2
<i>Percent of value of production</i>					
Less than \$250,000	43.8	40.7	38.4	31.4	28.3
\$250,000-\$499,999	17.2	16.0	18.1	15.6	14.3
\$500,000-\$999,999	13.0	13.8	15.2	15.4	15.8
\$1,000,000 or more	26.0	29.4	28.3	37.6	41.6
<i>Percent of value of contract production</i>					
Less than \$250,000	22.3	22.4	22.1	13.7	14.9
\$250,000-\$499,999	16.8	13.5	15.2	12.4	12.0
\$500,000-\$999,999	17.6	29.5	20.9	19.3	20.1
\$1,000,000 or more	43.3	44.6	41.8	54.7	53.0

Source: USDA, Economic Research Service, 1991-2001 Farm Costs and Returns Surveys
Agricultural Resource Management Surveys.

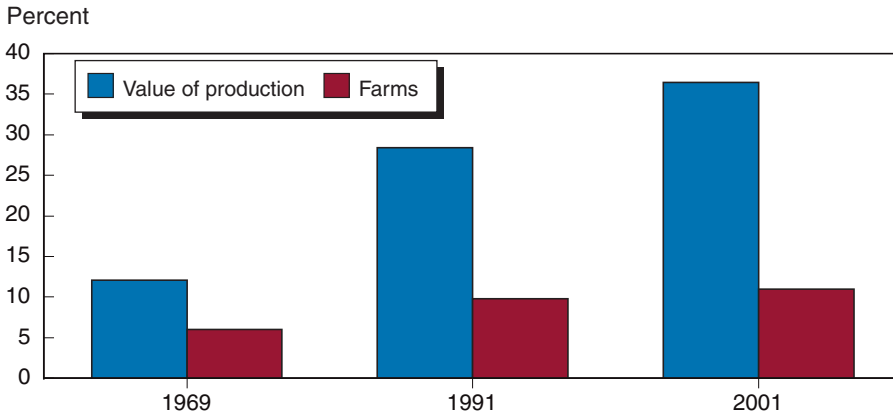
² To account for the effects of overall inflation, which will increase sales through price increases even if physical outputs remain unchanged, farm sales were adjusted using the Producer Price Index for farm products (which is also the USDA/NASS index of prices received by farmers). All sales values are expressed in 2001 dollars.

³ The share of production under contract in 1969 is overstated because the census of agriculture reported all the value of production of a commodity as contract value if the farm reported a contract for that commodity, not just the share of production covered by the contract.

Figure 5-1

Use of contracting, 1969-2001

The share of the value of agricultural production under contract increased to 36 percent in 2001

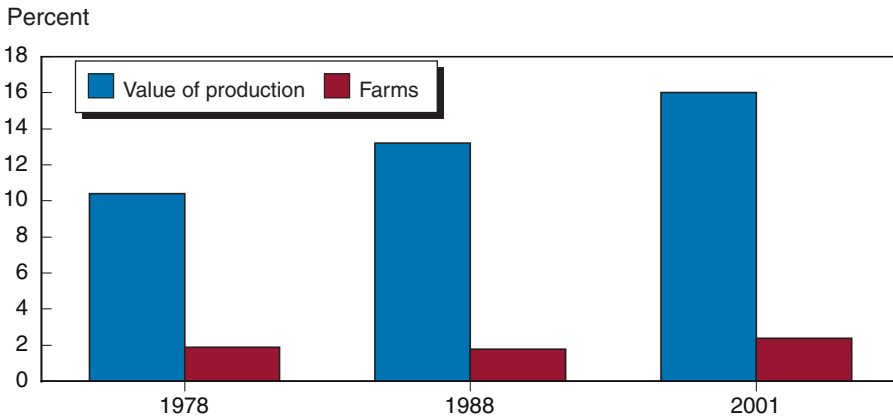


Sources: 1969, U.S. Department of Commerce, Agricultural Census; 1991 USDA, Farm Costs and Returns Survey; 2001, USDA, Agricultural Resource Management Survey, Phase III.

Figure 5-2

Use of production contracts, 1978-2001

The value of agricultural production under production contracts increased to 16 percent in 2001



Sources: 1978, U.S. Department of Commerce, Agricultural Census; 1988, Farm Finance Survey, Agricultural Economics Land Ownership Survey; 2001, USDA, Agricultural Resource Management Survey, Phase III.

Commodities and Contracting

Contracts are used more often for some commodities than for others. Contracts now cover nearly one-half of all livestock production (up from one-third in 1991-93), and they cover just over one-quarter of crop production (with no apparent trend) (table 5-5). Production contracts are used less often in crops—while marketing contracts are widely used in both crops and livestock.

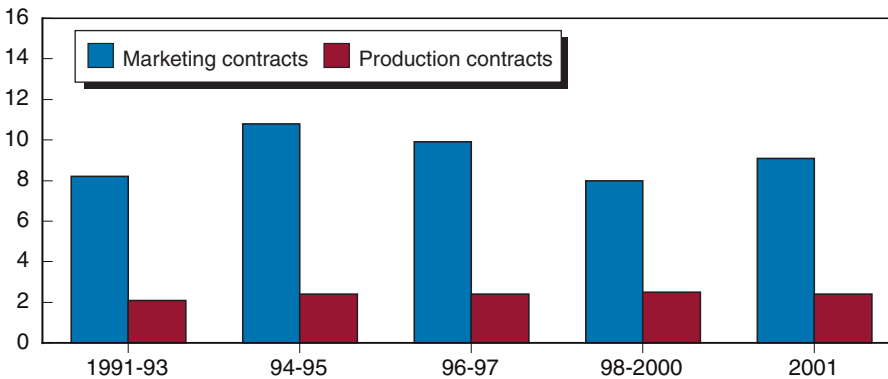
Contracts dominate production and exchange relationships in poultry and eggs (88 percent of the value of production in 2001), and accounted for 61

Figure 5-3

Farms with contracts by contract type

The share of farms using contracts has remained relatively constant

Percent



Sources: 1969, U.S. Department of Commerce, Agricultural Census; 1991, USDA, Farm Costs and Returns Survey; 2001, USDA, Agricultural Resource Management Survey, Phase III.

Table 5-4—Use of contracts for selected years

Item	1991-93	1994-95	1996-97	1998-2000	2001
	<i>Percent</i>				
Share of farms with contracts:					
Any contract:	10.1	13.0	12.1	10.6	11.0
Marketing contract	8.2	10.8	10.2	8.4	9.1
Crop	6.6	8.0	8.3	6.5	7.2
Livestock	1.6	3.0	2.0	2.0	1.9
Production contract	2.1	2.4	2.2	2.5	2.4
Crop	0.6	0.7	0.6	0.6	0.5
Livestock	1.6	1.7	1.6	1.9	1.8
Share of value of production under contract:					
Any contract	28.9	34.2	32.1	37.3	36.4
Marketing contract	17.0	21.2	21.5	20.4	20.3
Crop	11.0	12.2	12.2	11.3	11.8
Livestock	6.0	8.9	9.2	9.1	8.5
Production contract	11.8	13.0	10.6	16.9	16.0
Crop	0.9	1.0	*1.0	*2.1	*1.4
Livestock	10.9	12.1	9.6	14.7	14.6
Share of production value under contract:					
Heartland	11.1	12.6	15.6	25.1	27.3
Northern Crescent	17.4	34.0	29.5	32.6	32.6
Northern Great Plains	*22.7	14.8	15.7	26.3	*25.1
Prairie Gateway	29.3	33.6	*26.2	36.6	28.9
Eastern Uplands	40.4	57.7	45.6	45.6	46.8
Southern Seaboard	43.9	52.3	56.3	59.5	68.4
Fruitful Rim	49.4	52.7	47.1	47.1	40.5
Basin and Range	28.1	20.0	37.9	*32.2	*30.5
Mississippi Portal	24.6	22.4	23.9	31.6	35.2

* = Standard error is between 25 and 50 percent of the estimate.

Source: USDA, Economic Research Service, 1991-2001 Farm Costs and Returns Surveys, Agricultural Resource Management Surveys, Phase III.

Table 5-5—Share of commodity value produced under contract

Item	1991-93	1994-95	1996-97	1998-2000	2001
<i>Percent of value under contract</i>					
All crops and livestock	28.9	34.2	32.1	37.3	36.4
Crops	24.7	25.8	22.9	26.7	26.2
Corn	11.4	13.9	13.0	12.9	12.8
Soybean	10.1	10.0	13.5	10.3	8.7
Wheat	5.9	6.2	9.1	7.0	5.5
Rice	19.7	25.2	25.8	30.5	38.5
Peanut	47.5	58.3	34.2	45.1	**21.2
Tobacco	**0.3	*0.6	**0.3	*1.9	48.6
Cotton	30.4	44.5	33.8	42.9	51.7
Fruit	na	64.2	56.8	65.4	59.0
Vegetable	na	55.0	38.4	39.7	*36.9
Other crop	7.9	11.3	17.1	24.0	*17.9
Livestock	32.8	42.9	44.8	48.0	46.8
Cattle	na	19.0	*17.0	24.3	20.9
Hog	na	31.1	34.2	55.1	60.6
Poultry and egg	88.7	84.6	84.0	88.8	88.1
Dairy	36.8	56.7	58.2	53.6	53.1
Other livestock	*0.2	*9.3	4.9	10.8	*9.3

* = Standard error is 25 to 50 percent of the estimate.

** = Standard error is 51 to 75 percent of the estimate.

na = not available.

Source: USDA, Economic Research Service, 1991-2001 Farm Costs and Returns Surveys, Agricultural Resource Management Surveys, Phase III.

percent of the value of hog production in 2001, nearly double the share in 1994-95. Contracts are used far less often in cattle production. Contract use also varies significantly across different crops, ranging from 5.5 percent of wheat production, to more than half of fruits and cotton, to almost all sugar beet production. While the use of contracts for cotton and rice production has increased substantially in recent years, the largest shifts have occurred in tobacco and hogs.

Spot, or cash, auction markets had been the dominant method of marketing tobacco since the 1800s. Auctions were used because tobacco leaf cannot be easily graded into homogeneous categories through moisture samples or leaf color; rather, leaf quality is distinguished by a variety of less tangible characteristics, and buyers may require markedly different leaf characteristics, depending on final use.

Cigarette manufacturers proposed to replace auctions with contract marketing, arguing that contracts could better enable them to acquire sufficient quantities of the specific leaf qualities that they require. Contracts accounted for only 9 percent of flue-cured tobacco leaf deliveries, and 28 percent of burley tobacco, in the 2000 marketing year that ended in June 2001. But markets then changed quite quickly: marketing contracts covered 81 percent of 2001's flue-cured tobacco, and nearly two-thirds of burley sales. This shift had a strong impact on the traditional marketing infrastructure. Over half of North Carolina's 129 warehouses closed before the 2001 season began, and many other auction warehouses will likely close as the volume of auction leaf becomes too limited to support a network of auction markets (Capehart, 2002).

A survey of meatpackers found that they acquired 87 percent of their hogs in spot markets in 1993, with 11 percent acquired through marketing contracts and 2 percent owned by packers or sold through marketing contracts between packers and producers (Hayenga et al., 1996). The shares changed substantially in following surveys. Use of cash markets fell to 43 percent of hog marketings by 1997, and fell again to 26 percent in 2000 (Lawrence and Grimes, 2001). About one-quarter of the market hogs in 2000 were packer-owned, while about half were sold through marketing agreements.

Moreover, the shift to marketing contracts coincided with a decided shift toward the use of production contracts, under which integrators—often other hog producers—arranged for the production of market hogs that were then transferred to slaughter facilities under marketing contracts between integrators and packers. The expansion of contracting in hogs was partly driven by product differentiation: processors wanted greater control over the characteristics of the livestock they were buying, so that they in turn could provide a consistent quality of meat to consumers and better control processing costs.

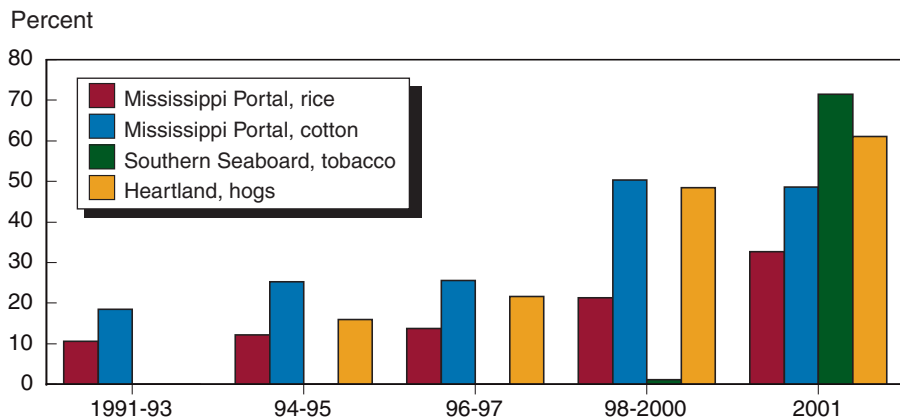
Contracting Expands in Distinctive Regional Patterns

For many agricultural commodities, contracting initially spreads among producers within a particular region, and only then spreads to other regions (Reimund et al., 1980). Figure 5-4 illustrates part of this process, capturing developments in selected farm resource regions (see box, “U.S. Farm Resource Regions”) in the 1990s for four commodities with significant increases in contracting—cotton, rice, tobacco, and hogs.

Hog contracting emerged initially in the Southern Seaboard, particularly in North Carolina during the late 1980s and the 1990s. It spread rapidly throughout the Heartland in the late 1990s, with contracts covering 60 percent of hog production (by value) in 2001, up from 20 percent only 5 years before.

Figure 5-4

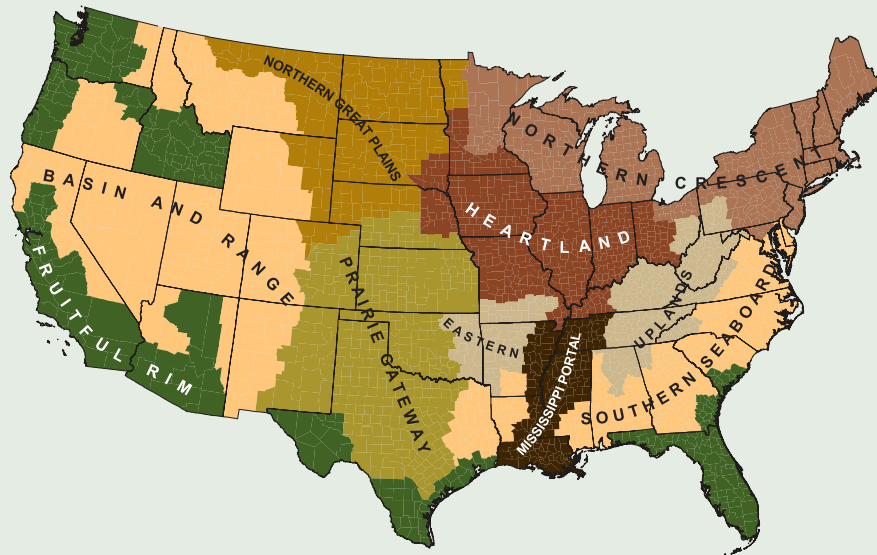
Value of production under contract for selected regions and commodities



Source: 1991-1995, USDA, Farm Costs and Returns Survey; 1996-2001, USDA, Agricultural Resource Management Survey, Phase III.

U.S. Farm Resource Regions

Farm resource regions are based on geographic specialization



Source: USDA, Economic Research Service.

The use of contracting increased substantially for two Mississippi Portal region crops—cotton and rice. There, contracts covered half of cotton production and one-third of rice production in 2001, up from a fifth and a tenth a decade before. Finally, the dramatic recent change in tobacco contracting occurs mostly in the Southern Seaboard.

At a point in time, the regional pattern of contracting largely reflects regional commodity differences. Four ERS resource regions encompass nearly three-fourths of farms with contracts, (table 5-6). Fruits and vegetables are important in the Fruitful Rim, hog and poultry production in the Southern Seaboard, dairy in the Northern Crescent, and hog production in the Heartland. By contrast, contracting is relatively unimportant in the cash grain areas of the Northern Great Plains.

Summary and Conclusions

Contracts have governed the production and marketing of some commodities like broilers and processing vegetables since the 1950s. Over the last 40 years, the growth in contract-governed production of other commodities has been slow and steady in the aggregate, and contracts now control much of the production of a few commodities, including broilers, processing vegetables, hogs, sugar beets, and tobacco. A combination of contracts and vertical integration dominates turkey and sugar cane production.

Contract and spot market production frequently coexist—for example, both cover large volumes of sales in fed cattle, cotton, and rice. However, the recent rapid shifts to contract production in hogs and tobacco suggest the same possibility for other commodities.

Table 5-6—Distribution of farms and contract value by farm resource region, 2001

Item	Heartland	Northern Crescent	Northern Great Plains	Prairie Gateway	Eastern Uplands	Southern Seaboard	Fruitful Rim	Basin and Range	Mississippi Portal	48-State total
All farms (number)	399,794	314,627	106,589	300,956	345,096	233,298	249,119	76,401	123,803	2,149,683
<i>Percent</i>										
All farms	18.6	14.6	5.0	14.0	16.1	10.9	11.6	3.6	5.8	100.0
Farms with contracts	22.9	18.7	3.9	8.7	8.3	12.1	19.4	2.0	3.9	100.0
Marketing	22.9	20.3	4.5	10.2	4.8	9.0	22.6	2.2	3.6	100.0
Crop	26.5	12.2	5.1	11.0	4.7	9.6	26.3	0.7	3.9	100.0
Livestock	9.7	50.5	2.4	7.3	5.0	6.8	8.5	7.7	*2.2	100.0
Production	27.2	15.4	*1.4	1.6	20.4	22.9	5.1	d	*5.0	100.0
Crop	38.7	38.2	d	d	d	d	13.3	d	d	100.0
Livestock	24.5	8.9	0.7	1.5	25.5	29.1	d	d	*5.9	100.0
Value of production:										
Share of total value	22.4	11.8	5.7	12.1	6.5	7.8	26.9	3.3	3.5	100.0
Share of contract value	16.8	10.6	3.9	9.6	8.3	14.6	30.0	2.8	3.4	100.0
Marketing	9.9	15.0	*3.2	7.2	1.6	6.0	49.4	4.6	3.2	100.0
Crop	10.4	6.8	3.2	5.8	*1.6	6.3	59.5	1.5	4.9	100.0
Livestock	9.1	26.3	**3.1	9.0	1.7	5.5	35.4	9.0	*1.0	100.0
Production	25.7	5.1	*4.9	12.7	16.9	25.6	5.3	*0.4	3.5	100.0
Crop	d	*11.0	d	d	d	*0.1	*31.3	d	d	100.0
Livestock	22.8	4.5	*5.3	13.8	18.4	28.1	2.8	*0.4	3.8	100.0
Share of farms in category with:										
Contracts	13.6	14.1	8.8	*6.8	5.7	12.3	18.5	*6.1	7.5	11.0
Marketing	11.2	12.6	8.1	*6.6	2.7	7.5	17.7	*5.6	5.6	9.1
Crop	10.2	*6.0	7.3	*5.6	2.1	6.3	16.2	*1.4	4.9	7.2
Livestock	*1.0	6.7	*0.9	*1.0	*0.6	*1.2	1.4	*4.2	**0.7	1.9
Production	3.4	*2.5	**0.7	*0.3	3.0	5.0	*1.0	a0.7	**2.0	2.4
Crop	1.1	*1.4	d	**0.1	d	a0.0	*0.6	d	d	0.5
Livestock	2.4	*1.1	d	*0.2	d	4.9	**0.4	d	d	1.8
Share of value of production in category:										
Under contract	27.3	32.6	*25.1	28.9	46.8	68.4	40.5	*30.5	35.2	36.4
Marketing	9.0	25.7	**11.3	12.1	*5.1	15.6	37.3	*28.5	19.0	20.3
Crop	5.5	6.8	*6.6	5.7	**2.9	9.6	26.1	*5.4	16.6	11.8
Livestock	*3.5	19.0	a4.7	*6.4	2.2	*6.0	11.2	*23.1	**2.4	8.5
Production	18.4	*6.9	**13.7	*16.8	41.7	52.9	3.2	a1.9	*16.2	16.0
Crop	**3.5	*1.3	D	**0.1	d	**0.0	*1.7	d	d	*1.4
Livestock	14.9	*5.6	**13.7	*16.7	41.5	52.8	*1.5	a1.9	*16.1	14.6

d = Data suppressed due to insufficient observations. * = Standard error is 25 to 50 percent of the estimate.
 ** = Standard error is 51 to 75 percent of the estimate. a = Standard error is greater than 75 percent of the estimate.
 Source: USDA, Economic Research Service, 2001 Agricultural Resource Management Survey, Phase III.

Emerging food safety concerns may require processors to trace food products back to their agricultural sources. Processors may also come under greater regulatory and market pressure to warrant that their products are free of some substances or that they contain others. If processors cannot identify agricultural qualities with quick and inexpensive tests at the point of purchase, they may form more tightly controlled supply chains, organized through contracts, to better control the agricultural production process.

Contracts can reduce farmer risks, but that does not appear to be the primary reason for their growth. Contracts can reduce processor costs by ensuring steady large flows of uniform agricultural products. Moreover, buyers are increasingly demanding products with specific product or production process attributes.

Women Farmers in Transition

Penni Korb

The number of farms with women as primary operators increased by 58 percent from 1978 to 1997. Much of that increase was from growth in animal specialty and general livestock farms. Once primarily focused on beef cattle, women primary farm operators have diversified in the last 20 years to specialize in horses, aquaculture, fur-bearing animals, and other kinds of livestock. On average, women operate smaller farms than men, and are far more likely to inherit their farms. This chapter presents important information about trends in and characteristics of farms operated primarily by women.

Introduction

The number of farms operated by women rose from 104,134 in 1978 to 165,102 in 1997, a 58-percent increase. By 1997, women were the primary operators of 9 percent of the Nation's farms, up from 5 percent in 1978, a shift reflecting women's increasing activity in all segments of the agricultural sector. Women may operate farms on their own, or with a partner or partners. They may work solely on the farm or combine onfarm and off-farm work. Women's participation in farming is as varied and diverse as the kinds of operations they run. Women who are not primary operators often provide services such as bookkeeping or purchasing, without receiving any cash income. This makes it more difficult to measure their contributions.

Sources of Information

The census of agriculture began collecting data on women as primary farm operators in 1978; since then, the census has recorded a steady increase in the share of women operators. A primary source of information here is the Census of Agriculture Longitudinal data file, (see Appendix I, "Sources of Data"), which enables women operators and the farms they operate to be tracked for the census years 1978, 1982, 1987, 1992, and 1997.

Two other surveys provide information about trends for women farmers—the Agricultural Resource and Management Survey (ARMS), conducted by the Economic Research Service (ERS) and the National Agricultural Statistics Service (NASS); and the Agricultural Economics and Land Ownership Survey (AELOS), conducted by NASS.

All three data sources ask respondents to name a primary farm operator, and then ask questions about the farm business, the farm household, and the primary operator. When a husband and wife operate a farm, the male is generally recorded as the primary operator. As a result, information about women's contributions has historically been limited to questions directed to

the primary (male) operator about his spouse, and to those circumstances in which a woman is the primary operator. Surveys since 2000 have collected more detailed information on all activities by farm women.

Livestock Farms Increase in Number and Share

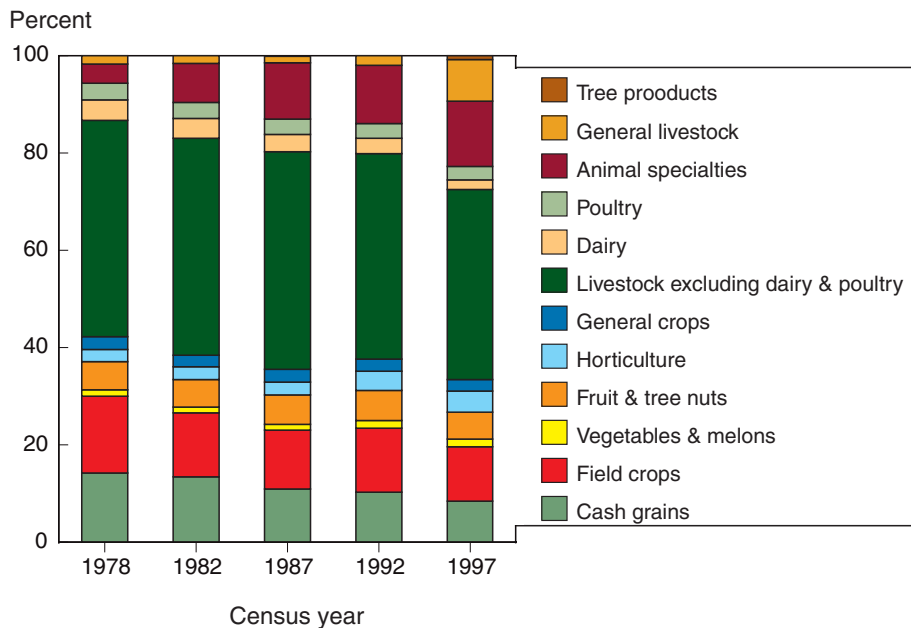
In 1978, 58 percent of women farmers specialized in livestock (versus 53 percent for men); by 1997, this category grew to more than 66 percent. During this period, two types of women-operated livestock farms—animal specialties and general livestock—increased both in number and share (appendix table V-2). The share of general livestock farms grew from 2 percent of farms operated by women in 1992 to 8.6 percent in 1997 (fig. 6-1); some of this increase could be due to changes in the treatment of responses to the census.

Animal specialties grew from 4,043 farms, or under 4 percent of farms operated by women in 1978, to 22,117 farms, over 13 percent, in 1997 (fig. 6-1). Most of this increase was in horse farms; women-operated horse farms increased from 3,428 in 1978 to 20,616 in 1997, a 500-percent increase in 20 years. The number of horse farms operated by men increased 170 percent over the period. Once considered a niche activity centered on the racing industry, equestrian-related enterprises have grown into big businesses. Interest in equine sports has increased, and women are active participants in this field. Animal specialty operations, and horse farms in particular, are unique in that they provide income to a wide variety of related equine businesses and industries. Like other livestock operations, they purchase feed and hay, and peripheral

Figure 6-1

Types of farms operated by women, 1978-97

Women have increased their share of livestock farms especially animal specialties like horse farms



Source: USDA, National Agricultural Statistics Service, compiled from the Census of Agriculture Longitudinal data file.

equipment like tractors, trucks, trailers, farm structures, and fencing. In addition, horse farms purchase equine apparel and equipment, and obtain services from farriers, veterinarians, and horse dentists. Even real estate values may be affected by the rising demand for choice land by horse farm, and potential horse farm, operators. While the racing industry has declined over the last 20 years, other horse sports—including show hunting and jumping, field hunting, driving, cutting, roping, dressage, and endurance—have grown.

Smaller Farms More Likely To Have Women as Primary Operators

Farms of less than 100 acres accounted for about 60 percent of all women-operated farms in 1997 and about 43 percent of farms operated by men, with each share growing slightly since 1978 (fig. 6-2). However, total land in these farms has never accounted for more than 7 percent of women’s total farmland or 4 percent of men’s.

Most U.S. acreage is on farms of 500 acres or more, which represent almost 10 percent of women-operated farms and cover 70 percent of their total acreage. Almost 20 percent of farms operated by men fell in this category, accounting for up to 80 percent of their acreage.

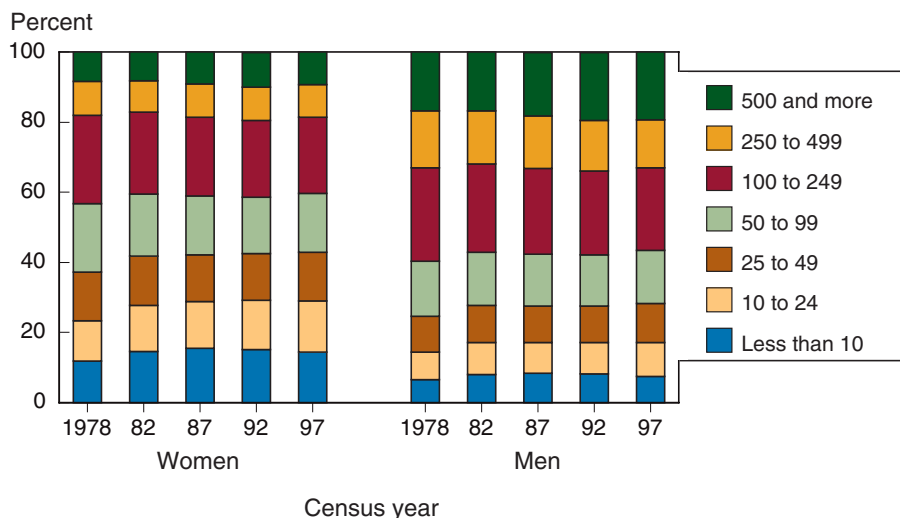
Overall, sales per farm were much lower for women than men in all census years (fig. 6-3). Average sales per farm¹ increased from just under \$24,000 for women crop farmers in 1978 to just over \$47,000 in 1997. Sales on crop farms operated by men increased from nearly \$60,000 in 1978 to \$120,000 in 1997. Most farms operated by women (over 60 percent in each census) have sales less than \$10,000 (fig. 6-4). In 1997, almost 69 percent of women operators fell into this category. Men had only about 49 percent of farms in this sales class.

¹ When using sales to measure trends in farm size over time, it is important to adjust for changes in agricultural prices, which will change revenue without any changes in the physical volume of production. Accordingly, in this chapter sales of agricultural products are adjusted for price changes using the Producer Price Index (PPI) for farm products, which is also the USDA/National Agricultural Statistics Service (NASS) index of prices received by farmers. Sales classes from the various censuses of agriculture presented in this chapter are expressed in 1997 constant dollars. Changes in the number of farms by constant-dollar sales classes, therefore, reflect changes in the quantity of products sold. Unfortunately, constant-dollar sales classes cannot be prepared before 1982, due to incomplete census records for individual farms prior to that year.

Figure 6-2

Distribution of farms within acreage class by gender, 1978-97

Women are far more likely to operate farms with small acreage than men and are only half as likely to farm 500 or more acres

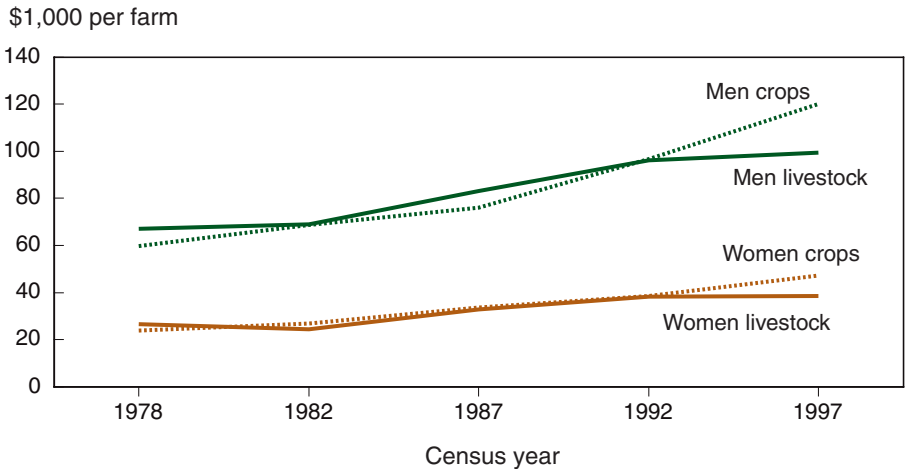


Source: USDA, National Agricultural Statistics Service, compiled from the Census of Agriculture Longitudinal data file.

Figure 6-3

Average sales per farm by operator gender, 1978-97

Sales per farm are much lower for women than men

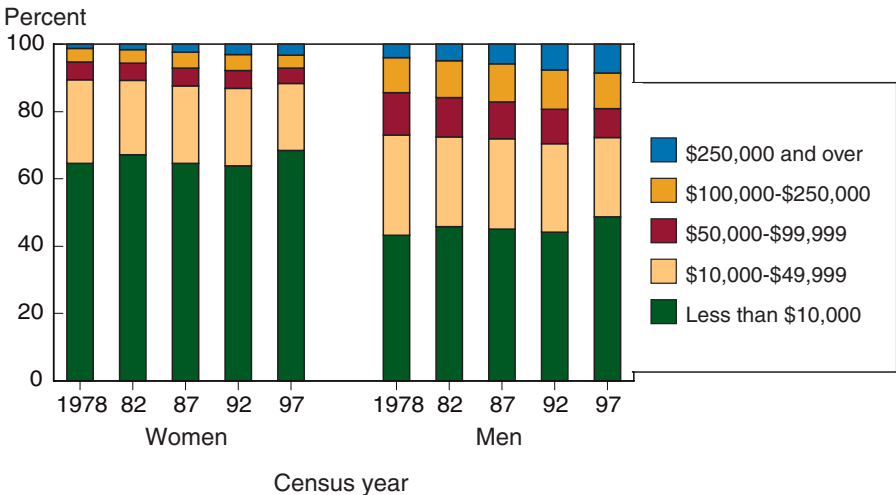


Source: USDA, National Agricultural Statistics Service, compiled from the Census of Agriculture Longitudinal data file.

Figure 6-4

Distribution of farms within sales class by gender, 1978-97

Women farmers have a larger portion of their farms in the lower sales classes than men operators



Source: USDA, National Agricultural Statistics Service, compiled from the Census of Agriculture Longitudinal data file.

Both men and women showed declines in the share of farms in the middle sales classes, and showed increases in the share of farms with sales greater than \$250,000. The number of farms run by women in the highest sales class increased more than 300 percent (4,000 farms) between 1978 and 1997. A similar increase occurred for men, though not as large on a percentage basis. The steady gains in the largest sales class for women are offset by the decline in all other classes except the lowest. Still, average sales per farm continue to be lower for women than for men in all sales categories.

Share of Women Primary Operators Who Are 54 or Younger Has Increased

Women typically start farming later than men, partly due to inheritance (table 6-1). While the average age of women farmers has remained steady (58), the age distribution has changed slightly. In 1978, 38 percent of women operators were under 55, compared with almost 44 percent by 1997. The share of men operators under 55 fell from 60 percent to 52 percent during the same period, with average age increasing from 50 to 53. Both men and women showed increases in the class representative of retirees, 65 and over—36 percent of women operators and a quarter of men fell in this category in 1997.

Women Operators Are Less Likely To Report Farming as Their Primary Occupation

Women operators are less likely than men to declare farming as their main occupation. Just over 45 percent of women farm operators reported farming as their main occupation according to the 1997 Census, versus 55 percent for men (table 6-2). These numbers dropped by about 5 percentage points for both men and women from 1992 to 1997. This may reflect both an increase in operators over 65 who are retired and an increase in off-farm work.

Table 6-1—Farm operators by gender and age class, 1978-97

Item	1978	1982	1987	1992	1997
<i>Number</i>					
Women:					
Under 45	19,966	29,970	33,406	33,615	35,353
45-54	20,068	22,058	23,272	28,513	36,451
55-65	29,287	30,368	30,302	30,735	33,727
65 and older	34,813	39,203	44,661	52,293	59,571
All	104,134	121,599	131,641	145,156	165,102
<i>Percent</i>					
Under 45	19.2	24.6	25.4	23.2	21.4
45-54	19.3	18.1	17.7	19.6	22.1
55-65	28.1	25.0	23.0	21.2	20.4
65 and older	33.4	32.2	33.9	36.0	36.1
<i>Number</i>					
Men:					
Under 45	695,929	769,596	656,317	554,863	485,394
45-54	490,896	483,354	431,638	400,820	430,278
55-65	482,431	506,034	465,514	399,104	393,627
65 and older	308,774	360,393	402,649	425,357	437,458
All	1,978,030	2,119,377	1,956,118	1,780,144	1,746,757
<i>Percent</i>					
Under 45	35.2	36.3	33.6	31.2	27.8
45-54	24.8	22.8	22.1	22.5	24.6
55-65	24.4	23.9	23.8	22.4	22.5
65 and older	15.6	17.0	20.6	23.9	25.0

Source: USDA, Economic Research Service, compiled from the Census of Agriculture Longitudinal data file.

Women are consistently more likely than men to fully own their farms and less likely than men to be tenant farmers. Almost 80 percent of women operators were full owners of their operations in 1997 (table 6-3), compared with 58 percent of men. The degree of full ownership has remained relatively stable among both men and women.

Women Are More Likely To Inherit Farms Than Men

Many women enter farming differently than men do. Inheritance² plays a substantial role in women's decisions to farm, accounting for 20-27 percent of their farm numbers, depending on the census year (fig. 6-5). Anywhere from 30,000-37,000 farms were inherited by women in any 5-year census period. This differs considerably from men's operations, where only about 1 percent (or around 20,000 farms) were inherited from women in a census period (table 6-4). Nevertheless, the number of farms inherited by men is growing, while the number of new entries and continuing operations³ has declined. About 30 percent of women's farm operations in any census are continuing operations, and new entrants account for an additional 42-48 percent. Men run continuing operations at twice the rate of women farmers (60-65 percent), and their entry rates are much lower (about 10 percent).

² Inheritance by a woman is estimated from the census of agriculture by measuring a change in a farm operation from a man operator to a woman operator over specified census years. Inheritance by a man is estimated by measuring a change in a farm operation from a woman operator to a man operator over specified census years.

³ Continuing operations include all operations that are not classified as inherited or as new entrants.

Table 6-2—Farm operators by gender and primary occupation, 1978-97

Item	1978	1982	1987	1992	1997
<i>Number</i>					
Women:					
Farming	52,466	62,532	67,488	73,444	75,166
Other	51,668	59,067	64,153	71,712	89,936
All	104,134	121,599	131,641	145,156	165,102
<i>Percent</i>					
Farming	50.4	51.4	51.3	50.6	45.5
Other	49.6	48.6	48.7	49.4	54.5
<i>Number</i>					
Men:					
Farming	1,097,856	1,172,255	1,070,691	979,706	886,394
Other	880,174	947,122	885,427	800,438	860,363
All	1,978,030	2,119,377	1,956,118	1,780,144	1,746,757
<i>Percent</i>					
Farming	55.5	55.3	54.7	55.0	50.7
Other	44.5	44.7	45.3	45.0	49.3
<i>Number</i>					
All:					
Farming	1,150,322	1,234,787	1,138,179	1,053,150	961,560
Other	931,842	1,006,189	949,580	872,150	950,299
All	2,082,164	2,240,976	2,087,759	1,925,300	1,911,859

Source: USDA, Economic Research Service, compiled from the Census of Agriculture Longitudinal data file.

Table 6-3—Farm operators by gender and farmland tenure¹, 1978-97

Item	1978	1982	1987	1992	1997
<i>Number</i>					
Women:					
Full	82,864	96,816	104,345	112,920	131,660
Part	13,779	16,251	17,968	21,750	22,451
Tenant	7,491	8,532	9,328	10,486	10,991
All	104,134	121,599	131,641	145,156	165,102
<i>Percent</i>					
Full	79.6	79.6	79.3	77.8	79.7
Part	13.2	13.4	13.6	15.0	13.6
Tenant	7.2	7.0	7.1	7.2	6.7
<i>Number</i>					
Men:					
Full	1,137,397	1,228,957	1,134,202	998,818	1,015,231
Part	605,584	639,998	591,044	574,907	551,388
Tenant	235,049	250,422	230,872	206,419	180,138
All	1,978,030	2,119,377	1,956,118	1,780,144	1,746,757
<i>Percent</i>					
Full	57.5	58.0	58.0	56.1	58.1
Part	30.6	30.2	30.2	32.3	31.6
Tenant	11.9	11.8	11.8	11.6	10.3

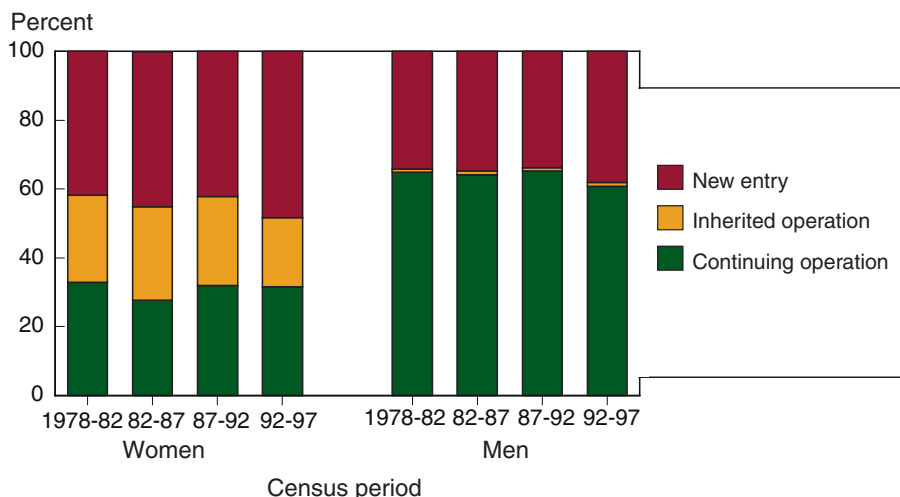
¹The share of farmland that is owned by the operator. On a tenant operation, all the farmland is rented.

Source: USDA, Economic Research Service, compiled from the Census of Agriculture Longitudinal data file.

Figure 6-5

Continuing farms, inherited farms, and new entries by gender, 1978-97

A larger portion of women farmers inherit their farms than men; however, the majority of women farmers in any given farm census are new entrants



Source: USDA, National Agricultural Statistics Service, compiled from the Census of Agriculture Longitudinal data file.

Table 6-4—Farms by operator gender, type of entry, and census period, 1982-97

Item	1978 to 1982	1982 to 1987	1987 to 1992	1992 to 1997
	<i>Number</i>			
Women operated farms: ¹	121,599	131,641	145,156	165,102
Continuing operations ²	40,011	36,505	46,346	52,072
Inherited from men	30,734	35,725	37,710	33,121
New entrants	50,854	59,411	61,100	79,909
Men operated farms: ¹	2,119,377	1,956,118	1,780,144	1,746,757
Continuing operations ²	1,374,558	1,255,854	1,161,461	1,061,725
Inherited from women	18,718	21,510	17,784	20,096
New entrants	726,101	678,754	600,899	664,936

¹ Number of farms at the end of the census period.

² All operations that are not classified as inherited or as new entrants.

Source: USDA, Economic Research Service, compiled from the Census of Agriculture Longitudinal data file.

Farms Operated Primarily by Women Are Growing in Numbers as Entry Rates Are Higher Than Exit Rates

Women's exit rates from farming are generally higher than men's, and at least some of this may be attributable to the kind of farms they run: smaller in acreage and lower in sales. However, women-operated farms are growing in number because they show even higher entry rates.

Minority women, except for Black women, have entered farming at very high rates. In 1978, there were 3,371 farms operated by Black women, accounting for 3.2 percent of women's farms. By 1997, that number of farms had declined to 1,710, just 1.0 percent of women's farms (table 6-5). While the number and share of Black women operators were declining, others increased. Farms operated by White women increased the most in numbers in the last 20 years, from around 99,000 in 1978 to just over 160,000 by 1997. Both the shares and numbers of other minority operators—including Native Americans and Asian/Pacific Islanders—increased, in some cases nearly tripling in number.

Emphasis on Primary Operator Understates Women's Role in Farm Businesses

While the longitudinal file provides useful information on women's farms since 1978, it only contains data on women who are listed as the primary operator of the farm. More recently, the census and ARMS survey have asked for information on all farm operators. In the 2002 Census, a woman was listed as the primary operator on 237,819 farms, or 11.2 percent of the total, up from 9.5 percent in 1997. But the survey also asked for information on additional operators on multiple-operator farms and found an additional 584,564 women that were farm operators, on farms where men were the primary operators. In turn, those data suggest that nearly 40 percent of U.S. farms in 1997 had at least one woman operator.

Table 6-5—Farm operators by gender and race, 1978-97

Item	1978	1982	1987	1992	1997
<i>Number</i>					
Women:					
White	99,093	116,580	127,481	140,715	160,035
Black	3,371	3,121	2,053	1,830	1,710
Native American	608	775	806	991	1,295
Asian	361	413	468	688	916
Other	701	710	833	932	1,146
All	104,134	121,599	131,641	145,156	165,102
<i>Percent</i>					
White	95.2	95.9	96.8	96.9	96.9
Black	3.2	2.6	1.6	1.3	1.0
Native American	0.6	0.6	0.6	0.7	0.8
Asian	0.3	0.3	0.4	0.5	0.6
Other	0.7	0.6	0.6	0.6	0.7
<i>Number</i>					
Men:					
White	1,930,733	2,070,029	1,915,638	1,741,098	1,704,166
Black	30,052	30,129	20,901	16,986	16,741
Native American	5,623	6,436	6,328	7,355	9,343
Asian	4,413	4,795	4,818	4,810	5,241
Other	7,209	7,988	8,433	9,895	11,266
All	1,978,030	2,119,377	1,956,118	1,780,144	1,746,757
<i>Percent</i>					
White	97.6	97.7	97.9	97.8	97.6
Black	1.5	1.4	1.1	1.0	1.0
Native American	0.3	0.3	0.3	0.4	0.5
Asian	0.2	0.2	0.2	0.3	0.3
Other	0.4	0.4	0.4	0.6	0.6

Source: USDA, Economic Research Service, compiled from the Census of Agriculture Longitudinal data file.

The Survey of Women on Farms, conducted by researchers at Penn State University in 2000, focused on all women's activities as farm operators, co-operators, bookkeepers, financial and technical advisors, errand runners, and housewives. The survey provides detailed information on how women operate their farms, the extent of their involvement in ownership and decision-making, and their future plans, in addition to the structural and financial characteristics of their farms. The survey reported that 53 percent of women considered themselves to be "the main operator or one of the main operators of the farm or ranch." This suggests that the earlier surveys reflect a conservative estimate of women's participation as operators on the farm.

Summary and Conclusions

Women account for a sharply growing number of primary farm operators, and they account for a small but sharply growing share of U.S. farms.

Women operate smaller farms than men. Once primarily focused on beef cattle, women farmers have diversified to specialize in other kinds of livestock such as horses, aquaculture, and fur-bearing animals. While women farm operators are generally older than men (at least partially due to their

large share of inherited operations), their age distributions clearly suggest increased participation at younger ages. And while the average age of women farmers has generally remained at 58 since 1978, the average age for men increased from 51 in 1982 to 54 in 1997.

Women primary operators are less likely than men to call themselves farmers. This may be because some are retired and do not consider themselves to be actively involved in farming while others have small operations that are secondary to an off-farm job.

Women are far more likely to inherit their farms than men are. More than 25 percent of women operators inherited their farms from their spouse during the four intercensus periods (1978-82, 1982-87, 1987-92, 1992-97), versus 2 percent of men. Most women start farming as new entrants, while men are much more likely to run continuing operations.

One Operator Per Farm

The census of agriculture historically defined a farm operator as the single person who made the majority of management decisions. Therefore, for agricultural census purposes, the number of farm operators was the same as the number of farms. In cases where both the husband and wife jointly operated the farm, the management role of one or the other was not measured; most likely, it was the woman's. Both ARMS and AELOS also collected data in a similar manner—one operator per farm.

In 2002, the Census and the ARMS collected information for up to three operators, with one designated as the primary operator or senior partner. They also asked for the total number of individuals involved in the day-to-day decisionmaking for the farm, and how many were women. The Canadian census of agriculture first collected this type of information in 1991; of the 100,700 women farm operators identified, 84 percent farmed with their husbands and another 6 percent farmed in multi-operator situations (Cloutier and Kemp, 1994). The additional 2002 ARMS and U.S. census questions will provide more accurate information about women operators on U.S. farms.

References

- Ahearn, Mary, David Banker, and Penni Korb. "Farm Policies and the Evolving Organization of U.S. Family Farms," Paper prepared for Conference of the Société Française d'Economie Rurale, Paris, France, Apr. 22-23, 2004.
- Bergen, Philip, Glenn Fox, and Ed Dickson. "Why Are Some Farms More Successful Than Others? A Review," Department of Agricultural Economics and Business, University of Guelph, Jan. 1990.
- Breimyler, Harold F. "Is There a Family Farm Anymore?," *Rural Wisconsin's Economy and Society: The Influence of Policy and Technology*, Agricultural Technology and Family Farm Institute, Madison, Wisconsin, Apr. 10, 1991.
- Capehart, Thomas. "Tobacco Industry Downsizing, Restructuring," *Agricultural Outlook*, U.S. Dept. Agr., Econ. Res. Serv., AGO-288 (Jan.-Febr. 2002):8-11.
- Cash, James A. "Where's the Beef? Small Farms Produce Majority of Cattle," *Agricultural Outlook*, U.S. Dept. Agr., Econ. Res. Serv., AGO-297, (Dec. 2002):21-24.
- Cloutier, Sylvain, and Lynda Kemp. "Socio-economic Characteristics of Operators on Canadian Census Farms," Paper prepared for Fifth Conference on Rural and Farm Women in Historical Perspective, Chevy Chase, MD, Dec. 1-4, 1994.
- Findeis, Jill. "U.S. Farm Women: Leaders in Rural Prosperity," Paper prepared for Agricultural Outlook Conference, Arlington, VA, Feb. 21-22, 2002.
- Freshwater, David, and Bill Reimer. "Socio-economic Policies as Causal Forces for the Structure of Agriculture," in *Farms, Farm Families and Farming Communities*, a special issue of *Canadian Journal of Agricultural Economics*. David H. Harrington, Leslie Whitener, Ray D. Bollman, David Freshwater, and Philip Ehrensaft, editors, (1995):209-222.
- Gale, Fred. "What's Behind the Declining Farm Count?" *Agricultural Outlook*, U.S. Dept. Agr., Econ. Res. Serv., AO-186, (June 1992):26-28.
- Gale, H. Frederick, and David H. Harrington. "U.S. Farms—Diversity & Change," *Agricultural Outlook*, U.S. Dept. Agr., Econ. Res. Serv., AO-198 (July 1993):3-6.
- Gardner, Bruce L. *American Agriculture in the Twentieth Century: How it Flourished and What it Cost*. Cambridge, MA: Harvard University Press, 2002.
- Gollehon, Noel, and Margriet Caswell (2000). "Confined Animal Production Poses Manure Management Problems," *Agricultural Outlook*, U.S. Dept. Agr., Econ. Res. Serv., AGO-274 (Sept. 2000):12-18.
- Gollehon, Noel, Margriet Caswell, Marc Ribaud, Robert Kellogg, Charles Lander, and David Letson, *Confined Animal Production and Manure Nutrients*, U.S. Dept. Agr., Econ. Res. Serv., AIB-771, June 2001.

- Harrington, David H., Robert A. Hoppe, R. Neal Peterson, David Banker, H. Frederick Gale, Jr. "Changes in the Farm Sector," in *Financing Agriculture into the Twenty-first Century*, Marvin Duncan and Jerome M. Stam, editors. Boulder CO: Westview Press, 1998.
- Hayenga, Marvin, V. James Rhodes, Glenn Grimes, and John Lawrence. *Vertical Coordination in Hog Production*, U.S. Dept. Agr., GIPSA-RR-96-5, May 1996.
- Hoppe, Robert A., editor. *Structural and Financial Characteristics of U.S. Farms, 2001 Family Farm Report*, U.S. Dept. Agr., Econ. Res. Serv., AIB-768, May 2001.
- Hoppe, Robert A. "Farm Households Are Often Dual-Career," *Rural America*, U.S. Dept. Agr., Econ. Res. Serv., Vol. 16, Issue 2 (Summer 2001):41-51.
- Hoppe, Robert A. *Farming Operations and Households in Farming Areas: A Closer Look*, U.S. Dept. Agr., Econ. Res. Serv., AER-685, May 1994.
- Hoppe, Robert A., and Penni Korb. "Farm Numbers: Largest Growing Fastest," *Agricultural Outlook*, U.S. Dept. Agr., Econ. Res. Serv., AGO-295 (Oct. 2002):24-27.
- Hoppe, Robert A., and Penni Korb. "Farm Operations Facing Development: Results from the Census Longitudinal File," Paper prepared for Annual Meeting of the American Agricultural Economics Association, Chicago Illinois, Aug. 5-8, 2001.
- Hoppe, Robert A., Robert Green, David Banker, Judith Z. Kalbacher, and Susan E. Bentley. *Structural and Financial Characteristics of U.S. Farms, 1993: 18th Annual Family Farm Report to Congress*, U.S. Dept. Agr., Econ. Res. Serv., AIB-728, Oct. 1996.
- Irwin, George D. "Viability of the Family Farm," Paper prepared for 31st Agricultural Workers Conference, Tuskegee Institute, Dec. 10-11, 1973.
- Lawrence, John D., and Glenn Grimes. "Production and Marketing Characteristics of U.S. Pork Producers, 2000," Iowa State University Staff Paper No. 343, Aug. 2001.
- MacDonald, James M., Michael E. Ollinger, Kenneth E. Nelson, and Charles R. Handy. *Consolidation in U.S. Meatpacking*, U.S. Dept. Agr., Econ. Res. Serv., AER-785, Feb. 2000.
- Mighell, Ronald L., and William S. Hoofnagle. *Contract Production and Vertical Integration in Farming, 1960 and 1970*, U.S. Dept. Agr., Econ. Res. Serv., ERS-479, Apr. 1972.
- Mishra, Ashok K., Hisham S. El-Osta, and James Johnson. "Factors Contributing to Earnings Success of Cash Grain Farms," *Journal of Agriculture and Applied Economics*, Vol. 31, No. 3 (Dec. 1999a): 623-637.
- Mishra, Ashok K., Hisham S. El-Osta, and Cheryl J. Steele. "Factors Affecting the Profitability of Limited Resource and Other Small Farms," *Agricultural Finance Review*, Vol. 59 (1999b):77-91.

- Mishra, Ashok K., and Mitchell J. Morehart. "Factors Affecting Returns to Labor and Management on U.S. Dairy Farms," *Agricultural Finance Review*, Vol. 61, No. 2 (Fall 2001):123-140.
- Nehring, Richard, Fernandez Cornejo, Jorge, and David Banker. "Off-Farm Labor and the Structure of U.S. Agriculture: The Case of Corn/Soybean Farms," Paper prepared for American Agricultural Economics Association Annual Meeting, Long Beach, CA., July 28-31, 2002.
- Peterson, R. Neal, and Nora L. Brooks. *The Changing Concentration of U.S. Agricultural Production During the 20th Century: 14th Annual Report to the Congress on the Status of the Family Farm*, U.S. Dept. Agr., Econ. Res. Serv., AIB-671, July 1993.
- Perry, Janet, and Jim Johnson. "What Makes a Small Farm Successful?" *Agricultural Outlook*, U.S. Dept. Agr., Econ. Res. Serv., AGO-266 (Nov. 1999):7-10.
- Reimund, Donn A., Martin J.R., and Moore, C.V. *Structural Change in Agriculture: The Experience for Broilers, Fed Cattle, and Processing Vegetables*, U.S. Dept. Agr., Econ. and Stat. Serv., TB-1648, 1980.
- Reimund, Donn A., and Fred Gale. *Structural Change in the U.S. Farm Sector, 1974-87: 13th Annual Family Farm Report to Congress*, U.S. Dept. of Agr., Econ. Res. Serv., AIB-647, May 1992.
- Ribaudo, Marc. "Managing Manure: New Clean Water Act Regulations Create Imperative for Livestock Producers," *Amber Waves*, U.S. Dept. Agr., Econ. Res. Serv., Vol. 1, Issue 1 (Feb. 2003):31-37.
- Ribaudo, Marc, Noel Gollehon, Marcel Aillery, Jonathan Kaplan, Robert Johansson, Jean Agapoff, Lee Christensen, Vince Breneman, and Mark Peters, *Manure Management for Water Quality: Costs to Animal Feeding Operations of Applying Manure Nutrients to Land*, U.S. Dept. of Agr., Econ. Res. Serv., AER-824, June 2003.
- Salant, Priscilla, Melinda Smale, and William Saupe. *Farm Viability: Results of the USDA Family Farm Surveys*, U.S. Dept. Agr., Econ. Res. Serv., RDRR-60, July 1986.
- Sumner, D.A. "Farm Programs and Structural Issues," in *The 1985 Farm Legislation*, B. Gardner (ed.), Washington, DC: American Enterprise Institute, 1985.
- U.S. Congress. Public Law 99-198, "Food Security Act of 1985," Dec. 23, 1985.
- U.S. Department of Agriculture. *Food and Agricultural Policy: Taking Stock for the New Century*, Sept. 2001.
- U.S. Department of Agriculture, Economic Research Service. *Agricultural Resource Management Survey (ARMS) Briefing Room*, March 2004. <<http://www.ers.usda.gov/Briefing/ARMS/>>
- U.S. Department of Agriculture, Economic Research Service. "What is a Family Farm," *Farm Structure Briefing Room*, July 2002. <<http://www.ers.usda.gov/briefing/FarmStructure/>>

- U.S. Department of Agriculture, National Agricultural Statistics Service. *Agricultural Economics and Land Ownership Survey (1999)*, in *Census of Agriculture*, 1998, Volume 3, Special Studies, Part 4, AC87-RS-2, July 2001.
- U.S. Department of Agriculture, National Agricultural Statistics Service. *1997 Census of Agriculture*, Vol. 1, Geographic Area Series, Part 51, United States Summary and State Data, AC97-A-51, Mar. 1999a.
- U.S. Department of Agriculture, National Agricultural Statistics Service. *Farms and Land in Farms: Final Estimates 1993-97*, SB-955, Jan. 1999b.
- U.S. Department of Agriculture, National Agricultural Statistics Service. *1997 Census of Agriculture*, Vol. 3, Special Studies; Part 4: Agricultural Economics and Land Ownership Survey, 1999, AC97-SP-1, Aug. 2001.
- U.S. Department of Agriculture, National Commission on Small Farms. *A Time to Act: A Report of the USDA National Commission on Small Farms*, MP-1545, Jan. 1998.
- U.S. Department of Commerce. *Agricultural Economics and Land Ownership Survey (1988)*, in *Census of Agriculture, 1987*, Volume 3, Related Surveys, Part 2, AC87-RS-2, July 1990.
- U.S. Department of Commerce. 1979 Farm Finance Survey, in *Census of Agriculture, 1978*, Volume 5, Special Reports, Part 6, AC78-SR-6, July 1982.
- U.S. Department of Commerce. 1960 Sample Survey of Agriculture, in *Census of Agriculture, 1959*, Volume 5, Special Reports, Part 5, 1962.
- U.S. Department of Commerce, Bureau of the Census. 1992 Census of Agriculture, Volume 1: Geographic Area Series, Part 51: United States Summary and State Data, AC92-A-51, Oct. 1994.
- U.S. Small Business Administration. "Frequently Asked Questions: Size Standards," <<http://app1.sba.gov/faqs>>.
- Warren, G.G., and M.C. Burritt. "The Incomes of 178 New York Farms," Bulletin 271, Cornell University, Agricultural Experiment Station, Dec. 1909.

Appendix I: Sources of Data

Most of the data in this report are from the Agricultural Resource Management Survey (ARMS) (U.S. Dept. of Agric., 2004), Phase III¹, and the census of agriculture. The ARMS, Phase III, collects financial data on U.S. farm businesses and information about farm operators and their households. The ARMS is designed and conducted each year by the Economic Research Service (ERS) and the National Agricultural Statistics Service (NASS), both agencies of the U.S. Department of Agriculture. ARMS Phase III has been conducted since 1996. Prior to 1996 (from 1984-1995), this information was collected on the Farm Costs and Returns Survey (FCRS). The census of agriculture began in 1840 (U.S. Dept. Agr., NASS, 1999a), which allows information to be tracked over long periods of time. In 1997, responsibility was transferred from the Department of Commerce, Bureau of the Census, to NASS. In contrast to the census, the ARMS (or FCRS) is a relatively new survey.

ARMS Data

The target population of the ARMS, Phase III is all farming units in the 48 contiguous States that sell or normally would sell at least \$1,000 of agricultural products during the calendar year covered by the survey.² The annual survey collects financial data on farm businesses and basic information on the farm operator and the operator household.

The relative standard error (RSE), a measure of sampling variability, is available from survey results. The RSE is the standard error of the estimate expressed as a percentage of the estimate. Any estimate with an RSE greater than 25 percent is identified in the figures and tables. Standard errors can also be used to evaluate the statistical differences between ARMS-based estimates. Different versions of the ARMS questionnaire are used each year, and each version collects information useful for a specific purpose. The relative standard error (RSE), a measure of sampling variability, is available from survey results. Standard errors can also be used to evaluate statistical significance of differences between ARMS-based estimates. Differences are stressed in the text only when estimates are significantly different at the 90-percent confidence level or higher.

The ARMS collects detailed information about one operator per surveyed farm. In the case of farms with more than one operator, detailed information is collected about the primary operator and limited information is collected about secondary operators. Similarly, the survey collects detailed information about one, primary household per farm and limited information about households of secondary operators.

In this report, the terms “household” and “family” are used interchangeably, although the ARMS actually collects household data. There is a technical difference between a family and a household. A family is made up of two or more people who live together and who are related by blood, marriage, or adoption. A household consists of all the people (related and unrelated) who live together in a housing unit. The ARMS also includes people dependent on the household who live elsewhere, such as college students living away

¹ ARMS Phase I, is a screening survey process used to identify farm operations eligible for sampling. Phase II collects information about production practices and costs for specific commodities on selected sample farm operations.

² Both ARMS and FCRS (its predecessor) exclude Alaska and Hawaii, largely for cost reasons.

from home. Most of the information in this report is for the farm operator and the operator's household.

Census of Agriculture Longitudinal File

The Census of Agriculture Longitudinal file is a subset of the census files; developed by combining individual farm operator records for five censuses (1978, 1982, 1987, 1992, and 1997) into one continuous record. Each record represents one individual farm operator's responses about a farm operation to all and/or any censuses. Thus, farms can be followed for a 20-year period. The file contains 4.5 million observations (records) and 85 analysis variables.

The longitudinal file attempts to follow farm operations that are tied to the farm land rather than follow individual farm operators. This is done using the census file number (CFN). The CFN identifies a farm operation for a particular census, and may follow a farm operation through subsequent censuses (up to five on the longitudinal file). If the farm continues from one census to the next, and the farm operator responds to the census using the same CFN, the information reported by that farm for that census period is appended to the longitudinal file using the same CFN. If the operation changes hands, either through sale or inheritance, the CFN may continue, it may change, or it may be terminated.

A farm is defined as going out of business when either the questionnaire is returned with the indication that it is no longer operating as a farm, or there is no response to repeated requests for information. The absence of a farm in a particular census year is represented in the longitudinal file by zeros for all the variables for that observation for that year. We consider a farm to be out of business (an exit) when zeros in the CFN field indicate that the farm has been discontinued. Likewise, a farm operation with a CFN that is not matched or linked to a previous longitudinal record would be considered a new business and added to the longitudinal file as a new record. This is classified as an entry.

While the CFN is unique to a single farm operation the opposite is not necessarily true. A single farm does not necessarily have one unique CFN. A CFN must only be unique to a farm operation for a given census time period. Therefore, a single farm operation could have as many as five CFNs on the longitudinal file, one for each census. While a farm operation's CFN may extend to subsequent censuses, this may not be the case if a farm changes hands. If a farm operation changes hands, the CFN may or may not change. If the operation is taken over by a family member it would likely continue with the old number. However, if it is sold, it would probably receive a new number. In this case the new number and the old number would be linked together. This linking would require matching farm operations either manually or by computer. Matching new CFNs to old CFNs would be performed by the data collection agency, either the Census Bureau or NASS. Linking allows data for the new CFN to be added to longitudinal data from the previous census under the old CFN, thereby extending the longitudinal record. If the farm is sold and no link established (there is no evidence that this farm is continuing) then zeros are recorded in the longitudinal CFN field and other data fields for that record for that census period.

Farms that are split up may have a portion of their operation continue under the old number and the rest under a new number/s, or all parcels of the operation may receive new numbers.

The longitudinal file is not truly longitudinal. Rather than identifying farms and following them as time progresses, it uses data collected in the past for another purpose (the agricultural census). Thus, it is subject to some measurement error.

Appendix II: Measuring Farm Operator Household Income

The Economic Research Service (ERS) estimates farm operator household income using the Agricultural Resource Management Survey (ARMS). Farm self-employment income from ARMS is the sum of the operator household's share of net farm business income (less depreciation) and wages paid to the operator. Adding other farm-related income of the operator household yields earnings of the operator household from farming activities. Finally, total operator household income is calculated by adding earnings from off-farm sources. Off-farm income may come from a variety of sources, including wages and salaries, interest, dividends, private pensions, and Social Security.

Operator household income is measured according to the definition of income used in the Current Population Survey (CPS), conducted by the Bureau of the Census. The CPS is the source of official U.S. household income statistics. Calculating an estimate of farm household income that is consistent with CPS methodology allows comparisons between the income of farm households and all U.S. households. The CPS defines income to include any receipts of cash. The CPS definition departs from a strictly cash concept by deducting depreciation, a noncash business expense, from income of the self-employed.

Appendix III: Defining Family Farms

There is no universally accepted definition of “family farm,” and Congress, researchers, and others have used a variety of definitions, implicit and explicit. Some of these definitions are summarized below:

1. All farms except large, nonfamily corporations (U.S. Congress, 1985)
2. Farms with no hired manager; no nonfamily corporations or cooperatives (Salant et al., 1986; Hoppe et al., 1996)
3. Farms using less than 1.5 person-years of hired labor; no hired manager (U.S. Congress, 1985)
4. Farms with less than 3.0 person-years of labor; family supplying at least half of labor (Irwin, 1973)
5. Farms with less than 1.5 to 2.0 family workers and the same or fewer number of hired workers; buying and selling in the market; self-managed; tenancy not extremely high (Breimyer, 1991)
6. Farms where agricultural production is either the primary occupation of the operator (or is an important contributor to family income); that provide at least half-time employment for an operator, family member, or a hired laborer; and that are operated by no more than three extended families (Sumner, 1985).

The Economic Research Service (ERS) uses definition 2, which includes all farms except those with hired managers and those organized as nonfamily corporations, cooperatives, estates, etc. (see box “Farms Included as Family Farms”). The farms included in definition 2 are closely held (legally controlled) by their operator and the operator’s family. The operator and operator families of the excluded farms have limited say over the distribution of the net income or equity of the farms they operate.

Under this definition, 97 percent of U.S. farms are classified as family farms. A definition that classifies all but 3 percent of U.S. farms as family farms may seem too inclusive. However, by any reasonable standard, most farms are small businesses, and small businesses tend to be family-run.

To some extent, the cutoff between small and large businesses is arbitrary, but some commonly used cutoffs result in most U.S. farms being classified as small. Three examples help make this point.

1. In the past, ERS classified farms as noncommercial (small) if they had less than \$50,000 in agricultural sales. Using this \$50,000 cutoff, 76 percent of all farms are classified as small (appendix table III-1).
2. The National Commission on Small Farms recommended classifying farms as small if they had sales less than \$250,000 (U.S. Dept. Agr., Nat’l. Comm. on Small Farms, 1998). The Commission’s cutoff classifies 93 percent of farms as small.
3. Finally, the Small Business Administration (SBA) generally classifies farms as small if they have sales of no more than \$750,000 (U.S. Small Bus. Adm.). By SBA standards, about 98 percent of U.S. family farms are small.

Farms Included as Family Farms

Under the Economic Research Service (ERS) definition, family farms include farms without a hired manager that are:

- Organized as sole or family proprietorships
- Organized as partnerships
- Organized as family corporations

Excluded from family farms:

- Farms with a hired manager
- Farms organized as nonfamily corporations
- Farms organized as cooperatives, estates, trusts, and grazing associations.

The SBA uses higher cutoffs for nonfarm businesses. Some common cutoffs are: 500 employees for most manufacturing and mining, 100 employees for all wholesale trade, \$6 million in annual revenue for most retail trade and services, \$28.5 million for most general and heavy construction contractors, and \$12 million for all special trade contractors.¹

Appendix table III-1—Farms classified as small under different cutoffs, 2001

Small-farm cutoff	Farms classified as small
	<i>Percent</i>
Sales less than \$50,000 (noncommercial farm cutoff, ERS)	76.0
Sales less than \$250,000 (small farm cutoff, U.S. Commission on Small Farms)	92.8
Sales of \$750,000 or less (small farm cutoff, U.S. SBA)	98.1

Source: USDA, Economic Research Service, 2001 Agricultural Resource Management Survey, Phase III.

¹ The SBA considers a variety of factors when establishing size standards: industry structure, degree of competition, average establishment size, startup costs, ease of entry, distribution of sales and employment by firm size, impact of different cutoffs on the SBA objectives, and comments from the public.

Appendix IV: Defining and Counting Farms

The official census definition of a farm is “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” (U.S. Department of Agriculture, National Agricultural Statistics Service, 1999a). If a place does not have \$1,000 in sales, a “point system” assigns values for acres of various crops and head of livestock to estimate a normal level of sales. “Point farms” are farms with fewer than \$1,000 in sales with points worth at least \$1,000. Point farms tend to be very small. Some, however, may normally have high sales but experience low sales in a particular year due to bad weather, disease, or other factors. Farms and point farms are determined for each census, based on current dollars. Both the census of agriculture and the Agricultural Resource Management Survey (ARMS) use the point system.

Although the official farm definition has not changed since the 1974 Census of Agriculture, minor differences existed between the census and USDA definitions (U.S. Department of Agriculture, National Agricultural Statistics Service, 1999b). The Census Bureau excluded Christmas tree farms and farms with all their cropland enrolled in the Conservation or Wetlands Reserve Programs (CRP and WRP). The Bureau, however, included farms having five or more horses and sales of no other farm products; USDA’s National Agricultural Statistics Service (NASS) excluded these in its surveys. After the responsibility for the census of agriculture was transferred to NASS from the Census Bureau, the NASS and census definitions were merged. The 1997 Census included Christmas tree and CRP/WRP farms, and NASS surveys began to include horse farms in 1995.

Two new types of farms—operations specializing in maple syrup or “short-rotation wood crops” (other than Christmas trees)—were added to both counts starting in 1997, due to the implementation of the new North American Industry Classification System. Short-rotation wood crops, which include trees grown for pulp or tree stock in addition to Christmas trees, have a harvest cycle of less than 10 years. The addition of these new farm types, however, had far less effect on the farm count in the census than the addition of CRP/WRP farms—discussed in the first chapter—simply because there were fewer of them. Farms specializing in maple syrup or short rotation wood crops totaled 14,400 in 1997. About 8,800 of these farms had sales less than \$10,000, including 1,500 point farms.

Despite the standardization of the census and NASS definitions, the 1997 Census count of farms (1,911,859) and the 1997 NASS count of farms (2,190,510) still differed because of Census undercoverage of farms (U.S. Department of Agriculture, National Agricultural Statistics Service, 1999a). The count of farms in the ARMS, used extensively in this report, is weighted to correspond to an initial version of the official NASS count,¹ excluding “abnormal farms” (institutional, experimental, and research farms) and farms in Alaska and Hawaii. Abnormal farms are outside the scope of ARMS, and ARMS excludes Alaska and Hawaii to reduce the cost of the survey.

¹ The initial NASS estimate is used each year because the final, or revised, estimate is not available when ARMS data are processed. See *Farms and Land in Farms: Final Estimates, 1993-97*, for information on how and when the estimates are revised.

The higher count of farms in ARMS, however, does not necessarily mean that statistics from ARMS are superior to those from the census. For example, the census is better at including the largest farms, those with sales greater than \$1,000,000. The farms that the census misses tend to be small, and farms with sales near the \$1,000 cutoff in the farm definition are most likely to be undercounted (U.S. Department of Agriculture, National Agricultural Statistics Service, 1999a). In contrast, ARMS undersamples farms with sales of \$1,000,000 or more. In 1997, the ARMS count of the largest farms was 30 percent below the census count (appendix table IV-1). The ARMS estimate of sales fell short of the corresponding census estimate by a similar magnitude, 32 percent. Nevertheless, both ARMS and the census show the same trend: greater concentration in agriculture.

Appendix table IV-1—Comparing farms with sales of \$1,000,000 or more from the 1997 Census of Agriculture and the 1997 Agricultural Resource Management Survey

Item	1997		ARMS as share of Census
	Agricultural Resource Management Survey (ARMS)	1997 Census of Agriculture	
	<i>Number</i>		<i>Percent</i>
Number of farms	2,049,384	1,911,859	107.2
Sales less than \$1,000,000	2,031,318	1,885,925	107.7
Sales of \$1,000,000 or more	18,065	25,934	69.7
	<i>Percent</i>		
Distribution of farms:			
Sales less than \$1,000,000	99.1	98.6	na
Sales of \$1,000,000 or more	0.9	1.4	na
	<i>Million dollars</i>		
Sales of agricultural products	164,996	196,865	83.8
Sales less than \$1,000,000	109,612	114,754	95.5
Sales of \$1,000,000 or more	55,384	82,111	67.5
	<i>Percent</i>		
Distribution of sales of agricultural products:			
Sales less than \$1,000,000	66.4	58.3	na
Sales of \$1,000,000 or more	33.6	41.7	na

na = Not applicable.

Note: The census of agriculture and the Agricultural Resource Management Survey (ARMS) define sales differently. The census defines sales to include the value of agricultural products sold or removed from the farm, regardless of who received the payment (the operator, partner, landlord, or contractor). Government payments are excluded. The ARMS definition in 1997 includes the operations government payments. The ARMS sales data in this table are adjusted to make them more comparable with census sales by subtracting government payments.

Sources: USDA, Economic Research Service, 1997 Agricultural Resource Management Survey, Phase III, and USDA, National Agricultural Statistics Service (1999a).

Appendix V Tables: Distribution of farms by gender, type, and acreage, 1978-97

Appendix table V-1—Farm numbers and acres operated by acreage class and gender, 1978-97

Item	1978		1982		1987		1992		1997	
	Farms	Acres	Farms	Acres	Farms	Acres	Farms	Acres	Farms	Acres
Women:										
Less than 10	12,368	43,470	17,671	66,366	20,227	73,467	22,124	85,560	23,800	97,279
10-24	11,904	191,601	16,010	254,814	17,792	280,333	20,366	321,151	24,171	381,549
25-49	14,538	529,048	16,969	614,043	17,408	627,809	19,469	700,784	22,807	819,997
50-99	20,257	1,461,143	21,668	1,557,824	22,130	1,592,737	23,248	1,663,302	27,674	1,982,807
100-249	26,177	4,105,915	28,317	4,436,900	29,797	4,701,900	31,855	5,022,720	36,144	5,686,913
250-500	10,125	3,496,073	11,072	3,821,500	12,323	4,256,312	13,802	4,771,512	15,320	5,285,317
500 and more	8,765	22,604,886	9,892	24,607,228	11,964	28,358,203	14,292	32,342,743	15,186	33,211,270
All	104,134	32,432,136	121,599	35,358,675	131,641	39,890,761	145,156	44,907,772	165,102	47,465,132
<i>Percent</i>										
Less than 10	11.9	0.1	14.5	0.2	15.4	0.2	15.2	0.2	14.4	0.2
10-24	11.4	0.6	13.2	0.7	13.5	0.7	14.0	0.7	14.6	0.8
25-49	14.0	1.6	14.0	1.7	13.2	1.6	13.4	1.6	13.8	1.7
50-99	19.5	4.5	17.8	4.4	16.8	4.0	16.0	3.7	16.8	4.2
100-249	25.1	12.7	23.3	12.5	22.6	11.8	21.9	11.2	21.9	12.0
250-500	9.7	10.8	9.1	10.8	9.4	10.7	9.5	10.6	9.3	11.1
500 and more	8.4	69.7	8.1	69.6	9.1	71.1	9.8	72.0	9.2	70.0
<i>Percent</i>										
Men										
Less than 10	129,691	487,226	169,994	662,025	163,030	600,209	144,372	575,842	129,715	551,778
10-24	155,165	2,512,660	191,864	3,082,170	174,538	2,797,275	162,652	2,606,978	169,285	2,720,468
25-49	201,425	7,350,321	224,409	8,144,238	202,699	7,355,427	185,224	6,710,765	194,570	7,042,223
50-99	309,850	22,505,404	322,107	23,279,459	288,737	20,868,127	260,107	18,762,939	267,359	19,248,230
100-249	528,894	86,017,190	531,206	86,199,991	477,939	77,499,721	423,997	68,534,281	409,666	65,825,743
250-500	319,758	112,760,632	323,792	114,267,825	292,217	103,295,755	258,785	91,267,716	239,578	84,366,140
500 and more	333,247	673,134,271	356,005	715,802,196	356,958	712,163,350	345,007	712,165,213	336,584	704,575,541
All	1,978,030	904,767,704	2,119,377	951,437,904	1,956,118	924,579,864	1,780,144	900,623,734	1,746,757	884,330,123
<i>Percent</i>										
Less than 10	6.6	0.1	8.0	0.1	8.3	0.1	8.1	0.1	7.4	0.1
10-24	7.8	0.3	9.1	0.3	8.9	0.3	9.1	0.3	9.7	0.3
25-49	10.2	0.8	10.6	0.9	10.4	0.8	10.4	0.7	11.1	0.8
50-99	15.7	2.5	15.2	2.4	14.8	2.3	14.6	2.1	15.3	2.2
100-249	26.7	9.5	25.1	9.1	24.4	8.4	23.8	7.6	23.5	7.4
250-500	16.2	12.5	15.3	12.0	14.9	11.2	14.5	10.1	13.7	9.5
500 and more	16.8	74.4	16.8	75.2	18.2	77.0	19.4	79.1	19.3	79.7

Source: USDA, Economic Research Service, compiled from the Census of Agriculture Longitudinal data file.

Appendix table V-2—Farms by operator gender and farm type, 1978-97

Item	1978		1982		1987		1992		1997	
	<i>Farms</i>	<i>Percent of farms</i>	<i>Farms</i>	<i>Percent of farms</i>	<i>Farms</i>	<i>Percent of farms</i>	<i>Farms</i>	<i>Percent of farms</i>	<i>Farms</i>	<i>Percent of farms</i>
Women:										
Cash grains	14,842	14.3	16,380	13.5	14,526	11.0	14,955	10.3	14,024	8.5
Field crops	16,360	15.7	15,980	13.1	15,900	12.1	19,151	13.2	18,409	11.2
Vegetables and melons	1,429	1.4	1,494	1.2	1,550	1.2	2,153	1.5	2,483	1.5
Fruits and tree nuts	5,963	5.7	6,929	5.7	7,934	6.0	9,041	6.2	9,025	5.5
Horticulture	2,583	2.5	3,127	2.6	3,483	2.6	5,617	3.9	7,257	4.4
General crops	2,819	2.7	2,958	2.4	3,599	2.7	3,565	2.5	4,042	2.4
Livestock excluding dairy and poultry	46,206	44.4	54,075	44.5	58,831	44.7	61,390	42.3	64,468	39.0
Dairy	4,325	4.2	4,949	4.1	4,662	3.5	4,584	3.2	3,264	2.0
Poultry and eggs	3,634	3.5	3,992	3.3	4,246	3.2	4,317	3.0	4,644	2.8
Animal specialties	4,043	3.9	9,669	8.0	15,256	11.6	17,445	12.0	22,117	13.4
General livestock	1,930	1.9	2,046	1.7	1,654	1.3	2,938	2.0	14,223	8.6
Tree products	na	na	na	na	na	na	na	na	1,146	0.7
Total	104,134		121,599		131,641		145,156		165,102	
Men:										
Cash grains	494,600	25.0	560,168	26.4	443,870	22.7	390,053	21.3	371,206	21.3
Field crops	244,094	12.3	237,273	11.2	227,728	11.6	231,187	12.6	219,285	12.6
Vegetables and melons	27,004	1.4	29,229	1.4	27,251	1.4	27,452	1.4	24,252	1.4
Fruits and tree nuts	68,544	3.5	77,442	3.7	80,389	4.1	80,473	4.2	73,499	4.2
Horticulture	23,817	1.2	26,070	1.2	27,986	1.4	34,095	2.1	37,403	2.1
General crops	62,916	3.2	55,557	2.6	54,289	2.8	45,242	2.6	45,796	2.6
Livestock excluding dairy and poultry	806,508	40.8	852,411	40.2	833,436	42.6	746,893	40.6	708,310	40.6
Dairy	146,108	7.4	159,679	7.5	133,649	6.8	108,828	4.8	82,983	4.8
Poultry and eggs	39,749	2.0	37,979	1.8	34,248	1.8	30,749	1.8	31,971	1.8
Animal specialties	32,133	1.6	55,371	2.6	72,599	3.7	63,059	4.1	71,923	4.1
General livestock	32,557	1.6	28,198	1.3	20,673	1.1	22,073	3.8	66,830	3.8
Tree products	na	na	na	na	na	na	na	na	13,299	
Total	1,978,030		2,119,377		1,956,118		1,780,104		1,746,757	

na = Not available as a separate group.

Source: USDA, Economic Research Service, compiled from the Census of Agriculture Longitudinal data file.

Appendix table V-3—Farm sales by operator gender and farm type, 1978-97

Item	1978		1982		1987		1992		1997	
	<i>Sales per farms (dollars)</i>	<i>Percent of sales</i>	<i>Sales per farms (dollars)</i>	<i>Percent of sales</i>	<i>Sales per farms (dollars)</i>	<i>Percent of sales</i>	<i>Sales per farms (dollars)</i>	<i>Percent of sales</i>	<i>Sales per farms (dollars)</i>	<i>Percent of sales</i>
Women:										
Cash grains	26,014	14.6	31,729	16.8	32,920	11.0	45,279	12.1	57,722	11.8
Field crops	15,052	9.3	16,999	8.8	21,922	8.0	22,983	7.9	22,487	6.0
Vegetables and										
melons	50,165	2.7	38,487	1.9	75,768	2.7	55,950	2.2	96,184	3.5
Fruits and tree nuts	31,859	7.2	34,644	7.8	47,833	8.7	50,698	8.2	59,595	7.8
Horticulture	37,186	3.6	39,234	4.0	59,144	4.7	57,789	5.8	70,558	7.5
General crops	20,383	2.2	16,717	1.6	13,980	1.2	22,445	1.4	26,994	1.6
Livestock excluding										
dairy and poultry	16,190	28.2	13,946	24.4	19,476	26.3	22,421	24.7	23,007	21.6
Dairy	62,773	10.3	82,497	13.2	112,059	12.0	147,254	12.1	192,875	9.2
Poultry and eggs	139,726	19.2	136,556	17.6	217,728	21.2	275,151	21.3	393,716	26.7
Animal specialties	12,709	1.9	10,695	3.3	10,461	3.7	12,485	3.9	10,435	3.4
General livestock	11,533	0.8	10,484	0.7	13,282	0.5	7,882	0.4	1,624	0.3
Tree products	na	na	na	na	na	na	na	na	35,728	0.6
Total	25,433		25,440		33,077		38,448		41,534	
Men:										
Cash grains	57,509	22.6	67,079	25.8	65,290	18.5	89,999	20.5	116,054	22.7
Field crops	44,231	8.6	49,033	8.0	60,028	8.7	67,326	9.1	77,108	8.9
Vegetables and										
melons	138,411	3.0	149,678	3.0	189,150	3.3	237,623	3.8	327,155	4.2
Fruits and tree nuts	76,906	4.2	81,243	4.3	98,232	5.0	116,905	5.5	161,114	6.2
Horticulture	142,515	2.7	158,312	2.8	235,379	4.2	232,908	4.6	265,117	5.2
General crops	54,122	2.7	64,897	2.5	58,827	2.0	80,078	2.1	90,664	2.2
Livestock excluding										
dairy and poultry	54,085	34.6	52,092	30.5	63,091	33.6	71,678	31.2	72,535	27.0
Dairy	100,413	11.7	126,000	13.8	155,258	13.3	194,161	12.3	244,799	10.7
Poultry and eggs	256,814	8.1	285,372	7.4	423,819	9.3	521,336	9.3	652,691	11.0
Animal specialties	26,721	0.7	24,783	0.9	24,811	1.2	25,203	0.9	30,139	1.1
General livestock	45,966	1.2	51,017	1.0	65,349	0.9	53,077	0.7	15,504	0.5
Tree products	na	na	na	na	na	na	na	na	30,985	0.2
Total	63,651		68,785		79,996		96,410		108,777	

na = Not available as a separate group.

Source: USDA, Economic Research Service, compiled from the Census of Agriculture Longitudinal data file.