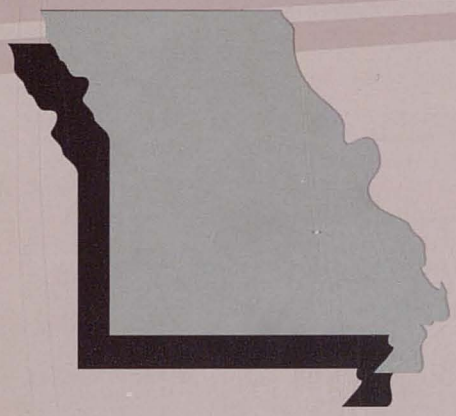
The Status and Potential of Missouri Agriculture



Perspectives on Agriculture, Food and Natural Resources

Missouri Agricultural Experiment Station Special Report 488

Perspectives on Agriculture, Food and Natural Resources

This special report is one of a series (listed below) prepared for a project of the Missouri Agricultural Experiment Station (AES).

The project, called "Perspectives on Agriculture, Food and Natural Resources," was designed to identify and describe trends in Missouri Agriculture and Rural Missouri and to assess the implications of changes that are occurring. A purpose was to assist the AES in establishing priorities and planning programs.

These reports provide background information on the future economic, social, political and technical environment for agriculture. A second series of reports, now being developed, examines the challenges and opportunities facing selected industries and identifies some of the research needed to help Missouri agriculture achieve its potential.

LIST OF PUBLICATIONS:

SR486	The Social and Economic Organization of Missouri Agriculture, 1964–1992
SR487	The State of Rural Missouri
SR488	The Status and Potential of Missouri Agriculture
SR489	Selected Characteristics of the Missouri Horticulture Industry
SR490	The Status of Selected Natural Resources in Missouri
SR491	Missouri's Food Processing Industry
SR492	10-Year Agricultural Outlook
SR493	Comparative Funding of the Missouri Agricultural Experiment Station

The Status and Potential of Missouri Agriculture

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Introduction

Missouri agriculture is productive and diverse. In 1993 there were about 106,000 farms on about 30.2 million acres of land in Missouri. Farmers manage about 68 percent of the 44 million acre land base in Missouri.

The land and climate resources of Missouri are exceptionally diverse. Some land in Missouri produces grain yields that are at or above the Corn Belt states average. Other regions of the state have annual average yields that are considerably below the average of Corn Belt states. Still, other regions are simply not suited to crop production. However, much of this latter type of land is well suited to forage production. As a result, Missouri is second only to Texas in the number of beef cows on farms. Moreover, with improved forage management and grazing systems, there is considerable potential for additional expansion in forage-based animal production in Missouri.

Livestock and poultry production have accounted for much of the growth in the value of agricultural production in Missouri over the past decade. Production of both broilers and turkeys has expanded primarily (but not totally) in the southwestern part of the state. After several years of decline, swine production in Missouri has increased substantially the past three years as large-scale swine operations have been developed in the state. Much of the land in the northern half of the state is well suited to modern methods of large-scale swine production.

If the federal government reduces its support of grain prices, the lower-yielding crop production areas of Missouri are expected to be converted into forage production, further expanding the state's capacity to support forage-based livestock production.

Crop Production

Missouri is a major producer of soybeans, corn, soft red winter wheat, grain sorghum, cotton, and rice. Missouri ranks in the top ten states nationally in the production of soybeans, corn, grain sorghum, and soft red winter wheat. Since 1964 more land has been cultivated for soybeans than for any other crop in Missouri (Figure 1). Corn and wheat acreage has declined, while the number of harvested acres for grain sorghum, cotton, and rice have increased.

The combination of diverse land resources and weather uncertainty result in highly variable annual state average yields of corn and soybeans in Missouri. The year-to-year variation in state average yields for these crops in Missouri is higher than in most states.

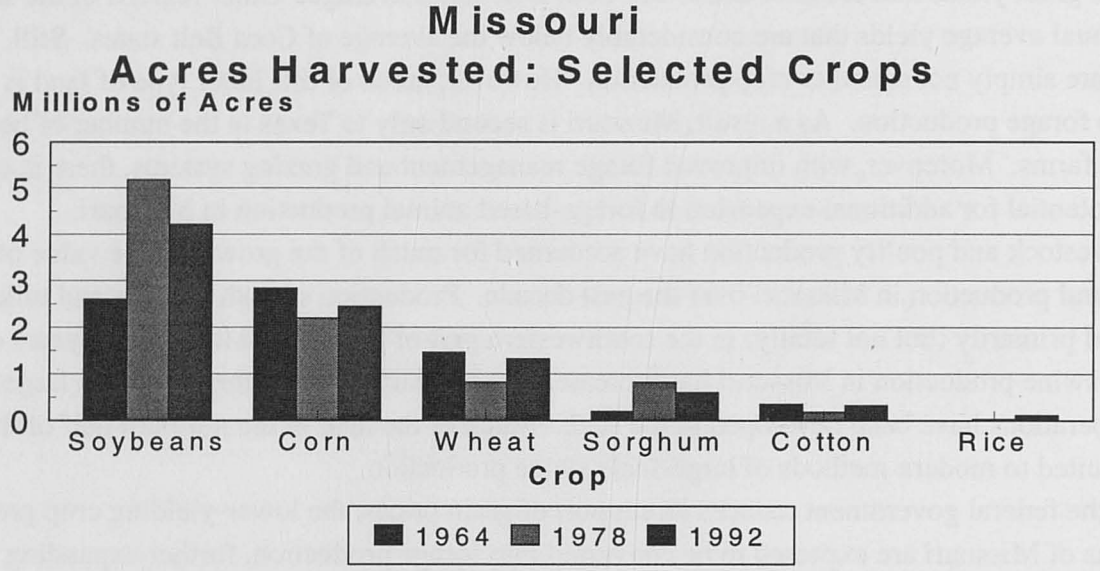
The most productive land in Missouri is generally along the rivers and in the Bootheel. These areas have yields that are substantially above the state average and that are comparable with states in the central Corn Belt.

Irrigated acreage in Missouri has increased substantially since the 1950s (Figure 2). In 1992 there were about 708,864 acres of cropland irrigated in Missouri (Figure 4). A comparison of Figures 3 and 4 shows that the increase in irrigation has occurred mainly along the major rivers and in the southern region of the state.

Crop yields on irrigated production are considerably less variable than on nonirrigated land. Private surface water impoundments are the primary source of irrigation water in Audrain and surrounding counties. Wells provide most of the irrigation water in the rest of the state.

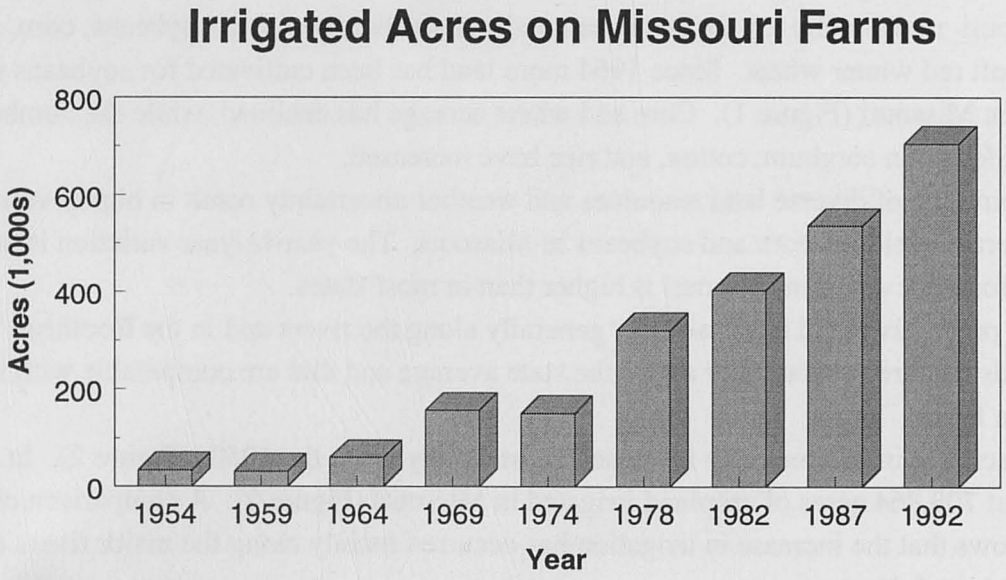
Irrigation is particularly important to Bootheel crop production. This area has substantially higher annual rainfall than other parts of the state. However, dry summer months coupled with highly productive soils make irrigation profitable in the Bootheel. The shallow water table in the area provides relatively low cost irrigation water for Bootheel crop producers.

Figure 1:



Note: Figures for soybeans, corn, wheat, and sorghum reflect acres harvested for grain only.
Source: U.S. Department of Commerce, Bureau of the Census, Census of Agriculture

Figure 2:



Source: USDA-NASS, MASS.
Census of Agriculture, U.S. Department of Commerce.

Figure 3:

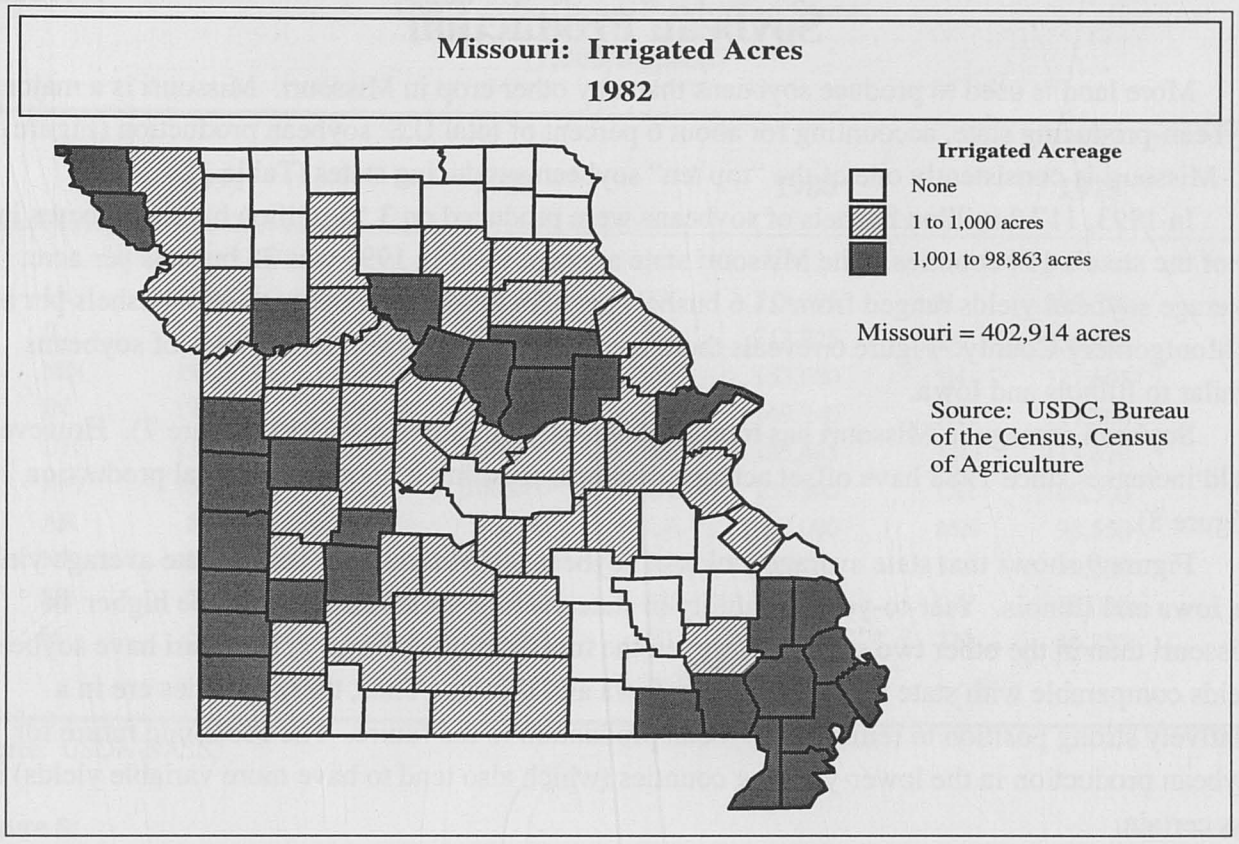
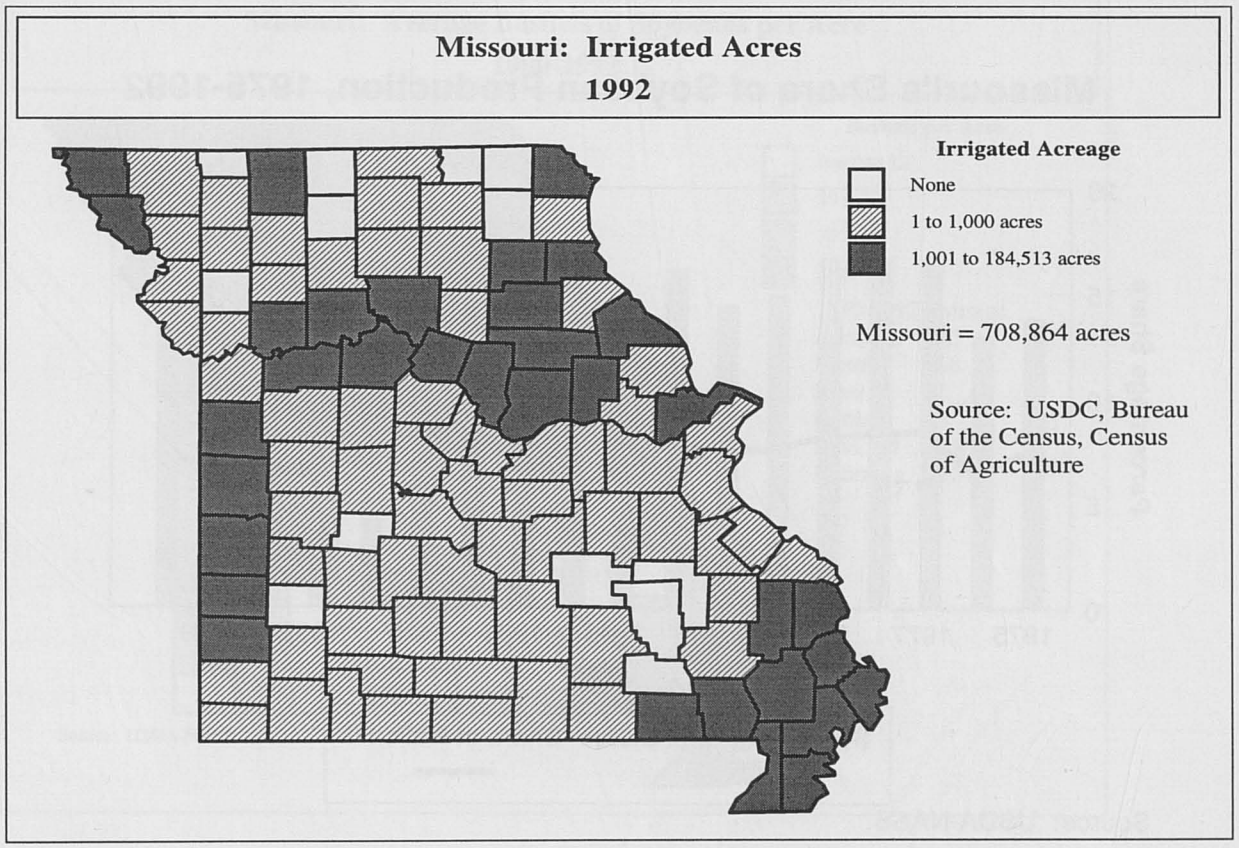


Figure 4:



Soybean Production

More land is used to produce soybeans than any other crop in Missouri. Missouri is a major soybean-producing state, accounting for about 6 percent of total U.S. soybean production (Figure 5). Missouri is consistently one of the "top ten" soybean-producing states (Table 1).

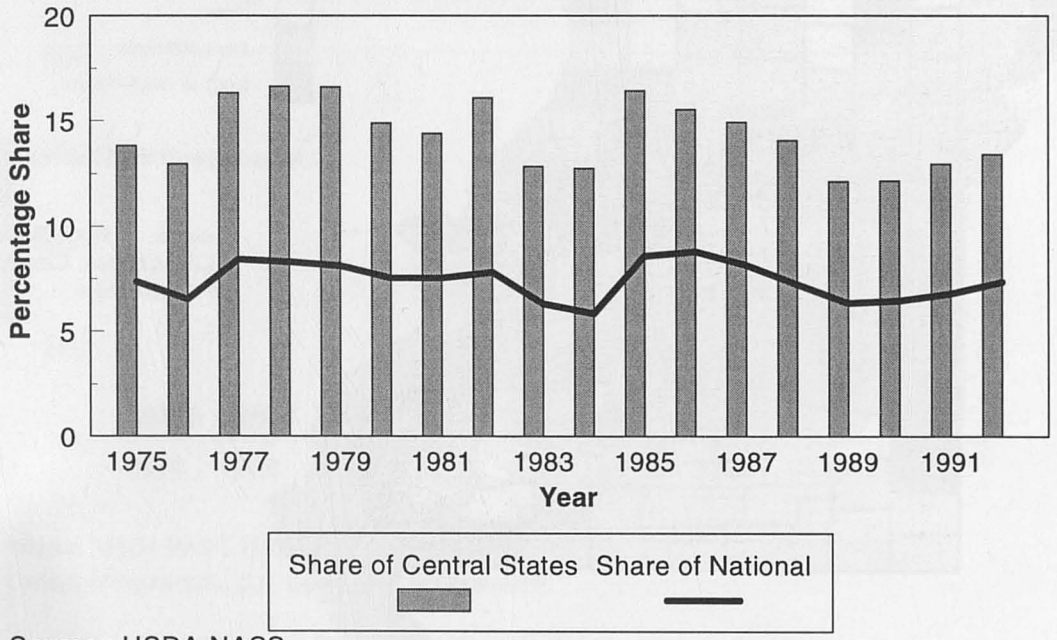
In 1993, 117.2 million bushels of soybeans were produced on 3.55 million harvested acres in 88 of the state's 114 counties. The Missouri state average yield in 1993 was 38 bushels per acre. Average soybean yields ranged from 21.6 bushels per acre in Mercer County to 40.2 bushels per acre in Montgomery County. Figure 6 reveals there are several counties that have yields of soybeans similar to Illinois and Iowa.

Soybean acreage in Missouri has trended downward slightly since 1985 (Figure 7). However, yield increases since 1988 have offset acreage declines, resulting in increases in total production (Figure 8).

Figure 9 shows that state average yields of soybeans in Missouri are below state average yields for Iowa and Illinois. Year-to-year variability in state average yields also tends to be higher in Missouri than in the other two states. However, the top-yielding counties in Missouri have soybean yields comparable with state average yields in Iowa and Illinois. Thus, these counties are in a relatively strong position to remain in soybean production in the future. The economic future for soybean production in the lower-yielding counties (which also tend to have more variable yields) is less certain.

Figure 5:

Missouri's Share of Soybean Production, 1975-1992



Source: USDA-NASS.

Table 1:

Top Ten Soybean-Producing States
(1,000 bushels)

	1991		1985		1980		1975	
1	IA	350,325	IL	382,500	IA	318,395	IL	299,520
2	IL	341,250	IA	309,700	IL	313,225	IA	236,980
3	MN	195,275	IN	185,090	IN	157,680	IN	121,605
4	IN	172,770	MO	180,435	MN	149,940	AR	117,500
5	OH	135,720	OH	160,605	MO	135,485	MO	113,620
6	MO	135,115	MN	160,000	OH	135,360	OH	102,300
7	AR	89,600	AR	98,050	LA	67,000	MN	98,550
8	NE	82,410	NE	84,960	AR	65,250	MS	70,200
9	SD	58,320	MS	70,740	MS	61,600	LA	48,000
10	MI	52,820	TN	45,260	NE	53,100	TN	46,250

Source: USDA-NASS.

Figure 6:

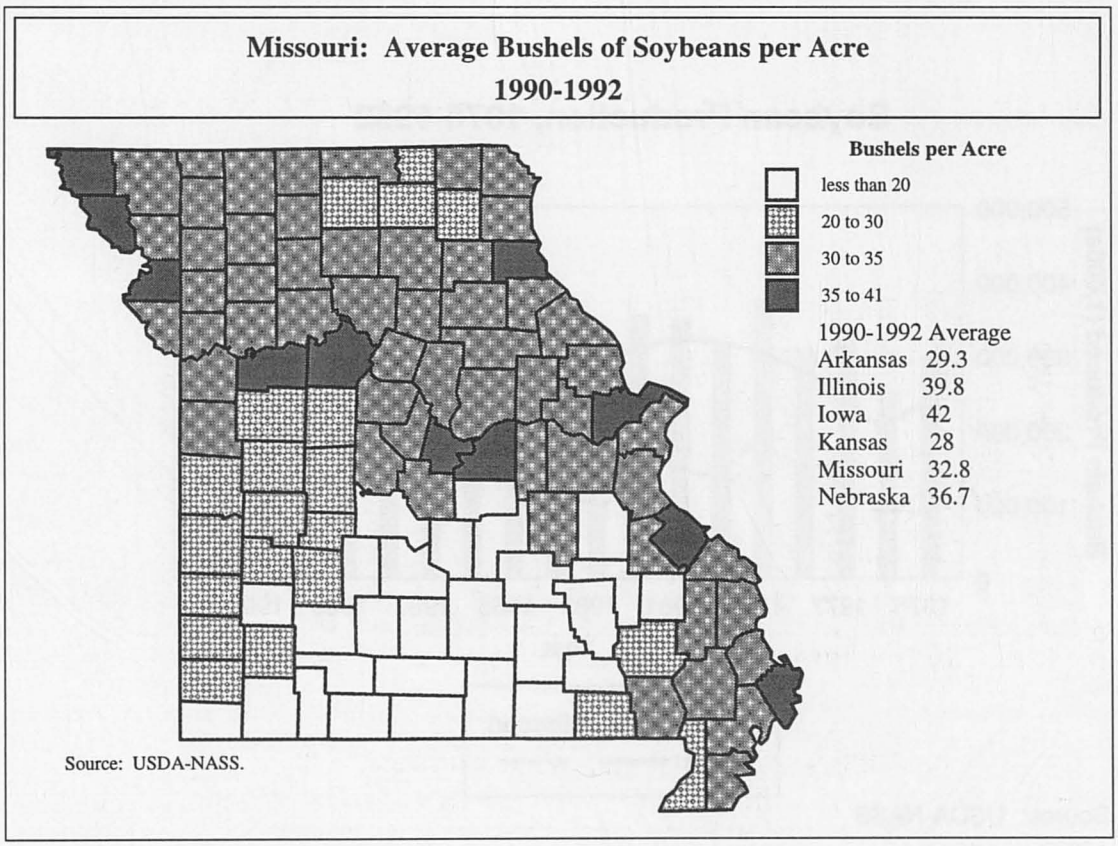
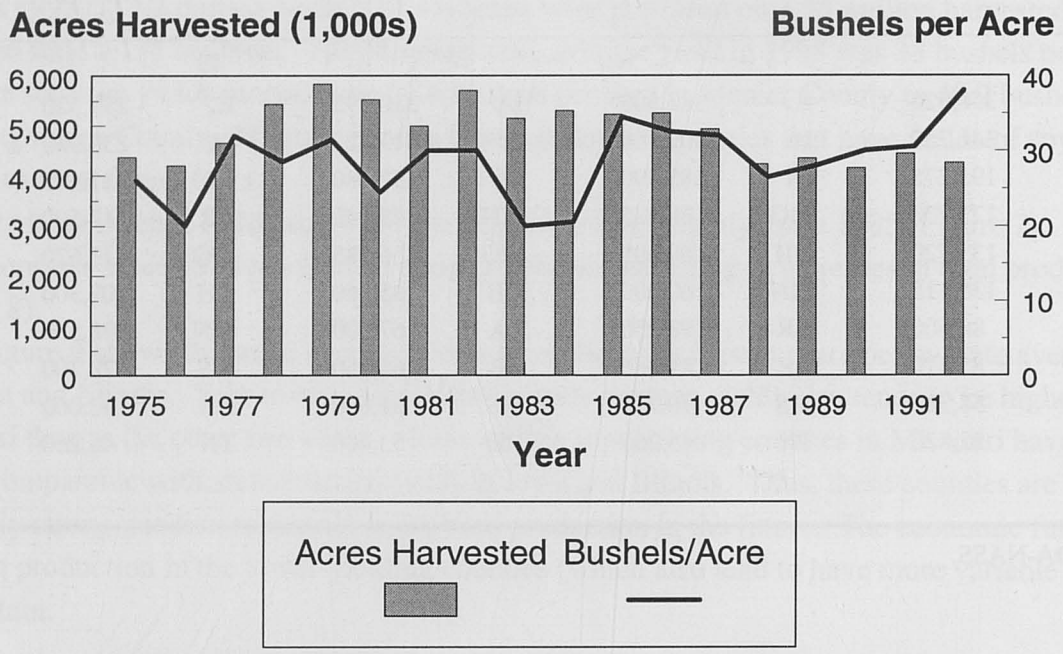


Figure 7:

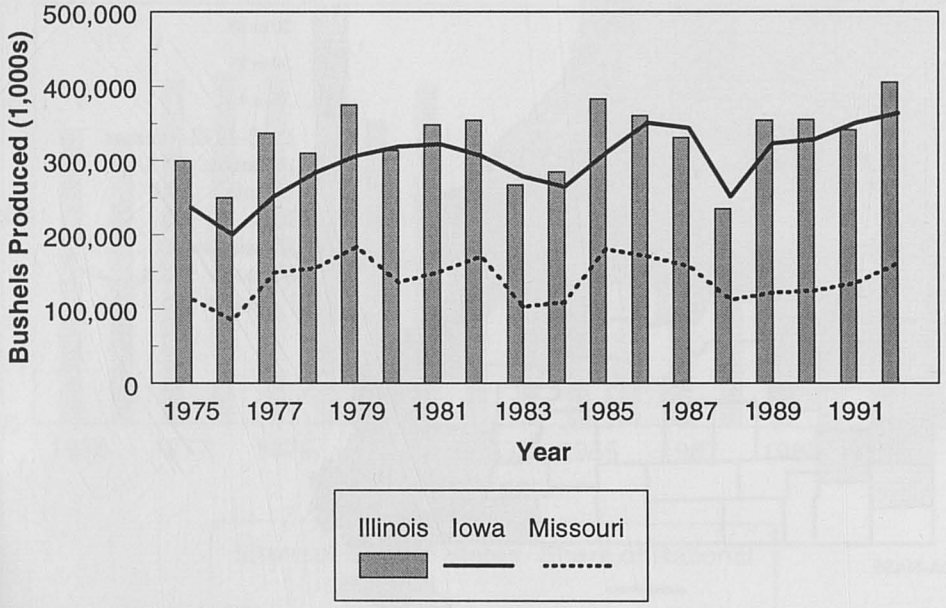
Missouri: Acres Harvested and Bushels per Acre of Soybeans, 1975-1992



Source: USDA-NASS, MASS.

Figure 8:

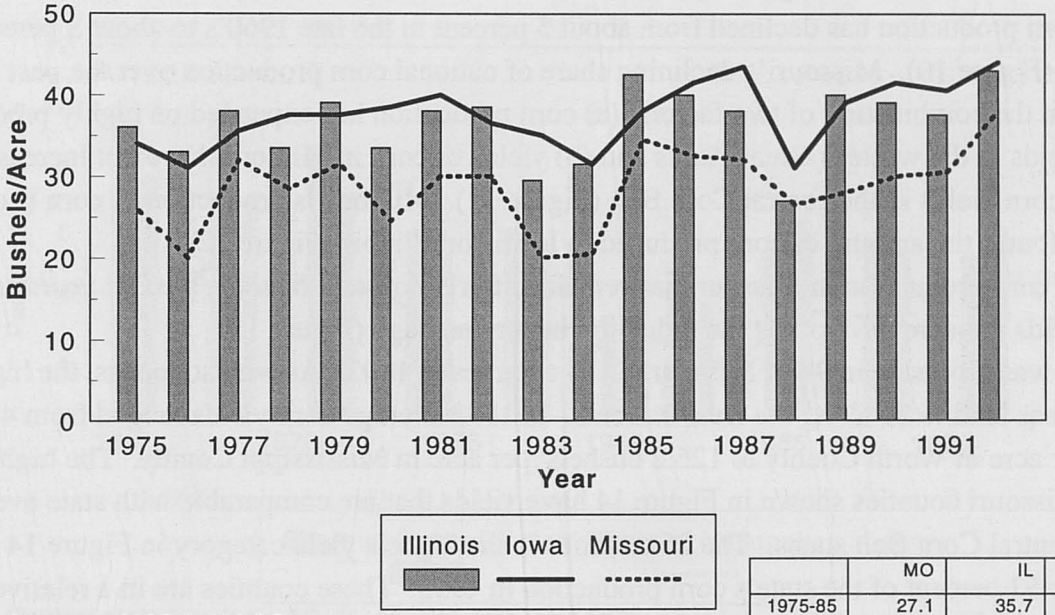
Soybean Production, 1975-1992



Source: USDA-NASS

Figure 9:

Yield per Acre of Soybeans, 1975-1992



Source: USDA-NASS.

	MO	IL	IA
1975-85 Avg.	27.1	35.7	35.9
1985-92 Avg.	31.5	38.4	39.9

Corn Production

In 1993 Missouri produced 166.5 million bushels of corn on 1.85 million harvested acres. Missouri is often one of the "top ten" producers of corn (Table 2). However, Missouri's share of national corn production has declined from about 5 percent in the late 1960's to about 3 percent in the 1990's (Figure 10). Missouri's declining share of national corn production over the past 25 years results from the combination of two factors: (a) corn production has expanded on highly productive irrigated lands in the western Great Plains and (b) yields of corn in Missouri have not increased as rapidly as corn yields in the central Corn Belt (Figure 11). Missouri's production of corn is only about one-fourth the amount of corn produced in Iowa and Illinois (Figure 12).

Total corn production in Missouri has remained fairly constant over the past 25 years as increased yields per acre have offset the reduction in corn acreage (Figure 13).

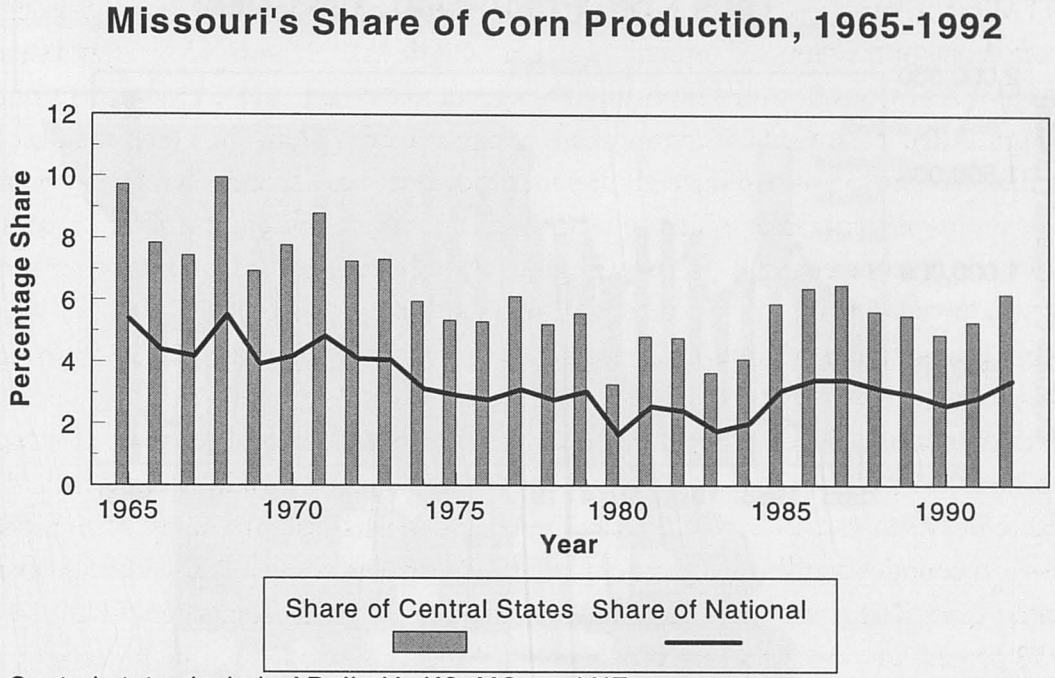
Corn was produced in 96 of Missouri's 114 counties in 1993. As with soybeans, the highest-yielding areas tend to be along the river bottoms. In 1993 average corn yields ranged from 47.4 bushels per acre in Worth County to 126.2 bushels per acre in Mississippi County. The highest-yielding Missouri counties shown in Figure 14 have yields that are comparable with state average yields of central Corn Belt states. The 25 counties in the highest yield category in Figure 14 accounted for 53 percent of the state's corn production in 1993. These counties are in a relatively strong competitive position for the future. However, competitive pressures will be strong in the lower-yielding counties to move land out of corn production and into forage production (or perhaps other crops) where yields will be closer to national average yields.

Table 2: **Top Ten Corn-Producing States**
(1,000 bushels)

	1991		1985		1980		1975	
1	IA	1,427,400	IA	1,707,300	IA	1,463,000	IL	1,253,960
2	IL	1,177,000	IL	1,534,950	IL	1,063,920	IA	1,117,800
3	NE	990,600	NE	953,600	MN	610,130	IN	551,740
4	MN	720,000	IN	756,450	NE	603,500	NE	503,200
5	IN	510,600	MN	724,500	IN	602,880	MN	407,400
6	WI	380,800	OH	511,810	OH	440,700	OH	310,620
7	OH	326,400	WI	358,450	WI	348,400	WI	198,370
8	MI	253,000	MI	286,650	MI	243,200	MI	176,000
9	SD	240,500	MO	272,800	SD	121,900	MO	170,100
10	MO	213,400	SD	252,000	TX	117,000	KS	141,040
					MO #12			

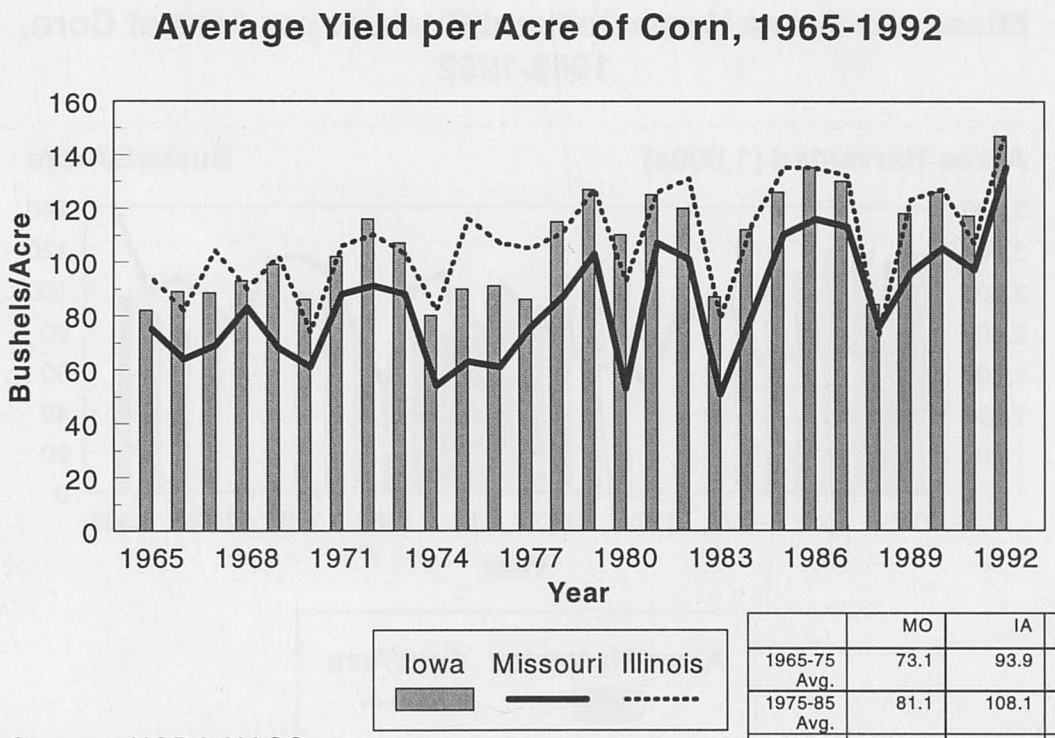
Source: USDA-NASS, MASS.

Figure 10:



Central states include AR, IL, IA, KS, MO, and NE.
Source: USDA-NASS.

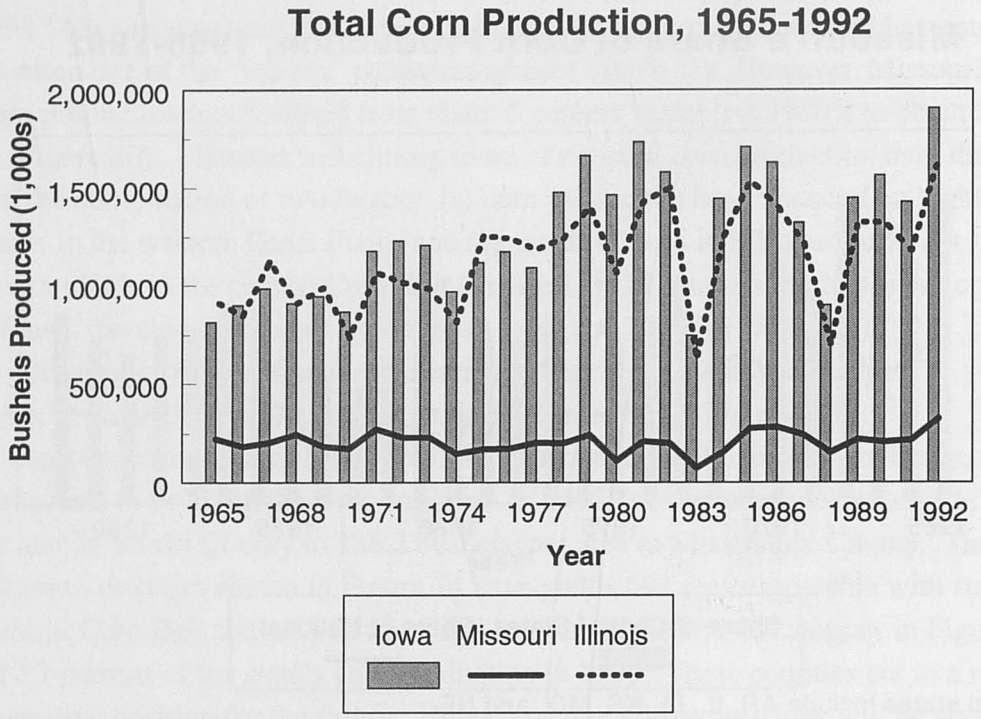
Figure 11:



	MO	IA	IL
1965-75 Avg.	73.1	93.9	96.6
1975-85 Avg.	81.1	108.1	113.1
1985-92 Avg.	106	122.9	122.6

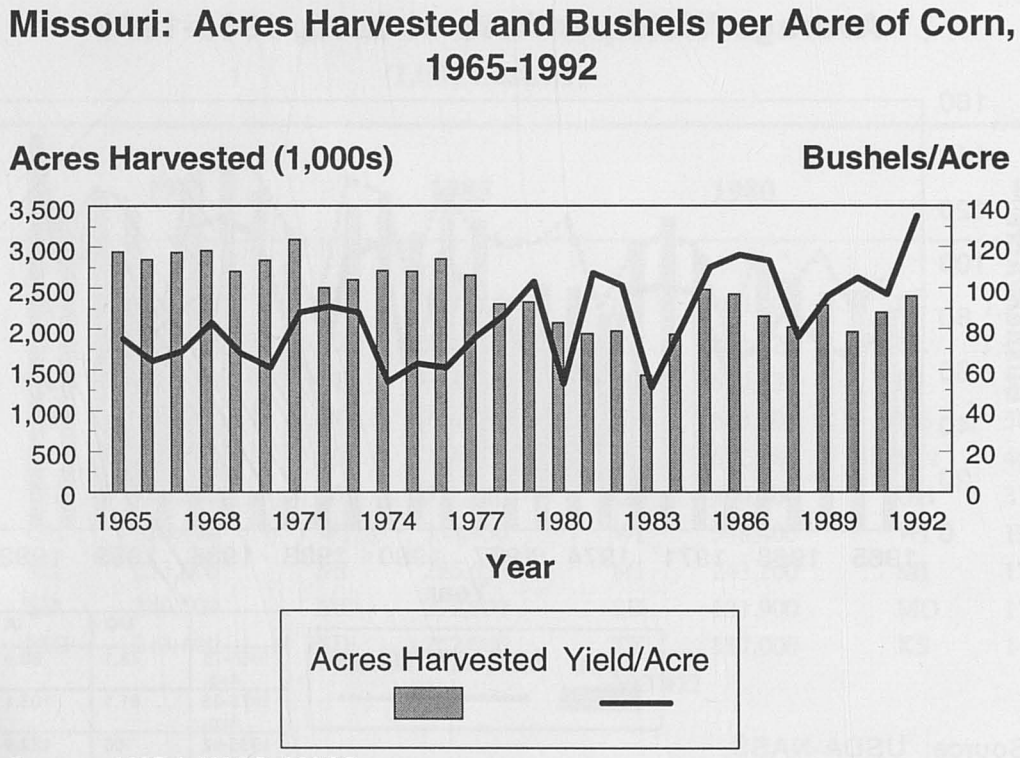
Source: USDA-NASS.

Figure 12:



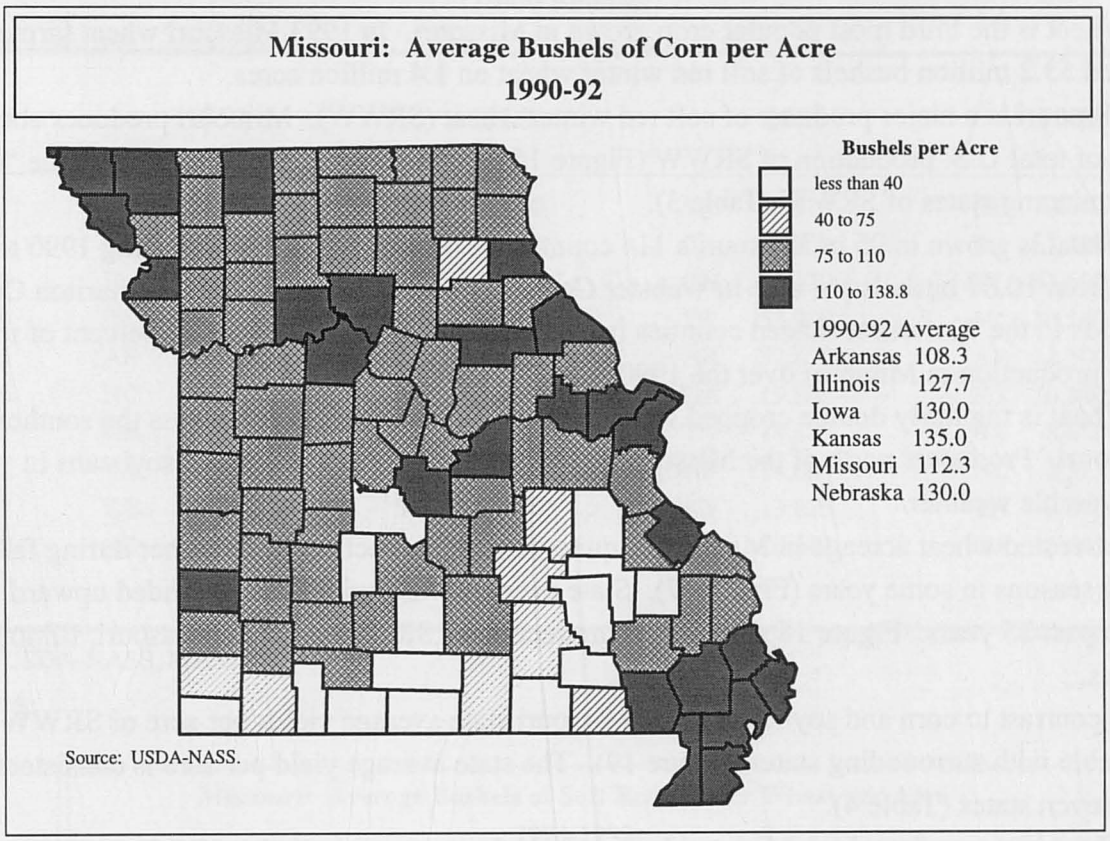
Source: USDA-NASS.

Figure 13:



Source: USDA-NASS, MASS.

Figure 14:


Missouri: Average Bushels of Corn per Acre
1990-92
Bushels per Acre
less than 40
40 to 75
75 to 110
110 to 138.8
1990-92 Average
Arkansas 108.3
Illinois 127.7
Iowa 130.0
Kansas 135.0
Missouri 112.3
Nebraska 130.0
Source: USDA-NASS.

Wheat Production

Wheat is the third most popular crop grown in Missouri. In 1993 Missouri wheat farmers produced 53.2 million bushels of soft red winter wheat on 1.4 million acres.

Missouri is a major producer of soft red winter wheat (SRWW). Missouri produces about 18 percent of total U.S. production of SRWW (Figure 15). Missouri is consistently among the "top five" producing states of SRWW (Table 3).

Wheat is grown in 95 of Missouri's 114 counties. County average yields during 1990 to 1992 ranged from 10.67 bushels per acre in Webster County to 45.2 bushels per acre in Chariton County. The yields in the 22 darkest shaded counties in Figure 16 accounted for about 35 percent of total SRWW production in Missouri over the 1990-92 period.

Wheat is regularly double cropped with soybeans in the Bootheel and across the southern half of Missouri. Producers north of the Missouri River also double crop wheat and soybeans in years with favorable weather.

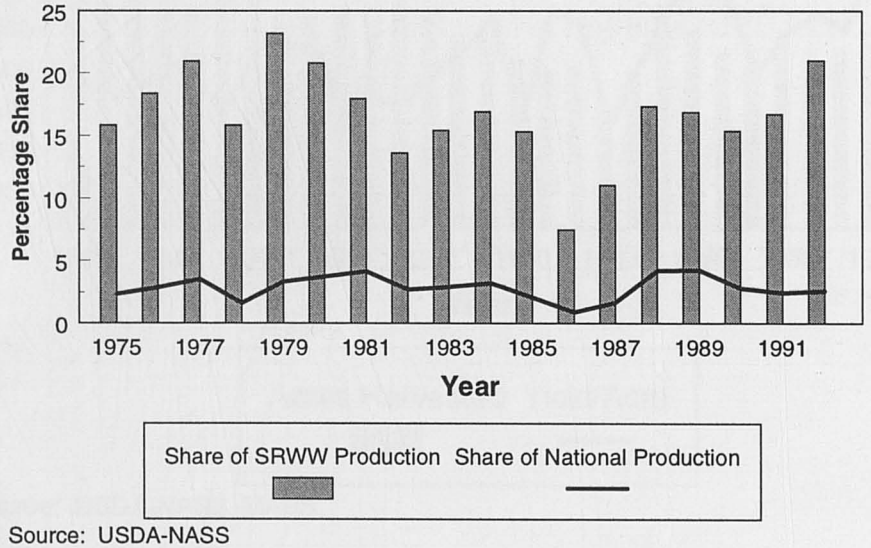
Harvested wheat acreage in Missouri is quite variable, reflecting wet weather during fall planting seasons in some years (Figure 17). State average wheat yields have trended upward slightly over the past 25 years. Figure 18 shows total production of SRWW between Missouri, Illinois and Arkansas.

In contrast to corn and soybean yields, Missouri state average yields per acre of SRWW are comparable with surrounding states (Figure 19). The state average yield per acre is consistently in the top seven states (Table 4).

Wheat is a crop for which Missouri has a relatively strong competitive position as indicated by comparative yields. Only Ohio and Indiana have consistently higher state average yields than Missouri. With continued development of new varieties adapted to the growing conditions in Missouri, the state is likely to continue to be one of the leading states in SRWW production.

Figure 15:

Missouri's Share of Wheat Production, 1975-1992



Source: USDA-NASS

Table 3: **Top Ten Soft Red Winter Wheat-Producing States**
(1,000 bushels)

	1991		1985		1980		1975	
1	OH	52,920	OH	58,900	MO	89,010	OH	70,560
2	MO	48,000	MO	49,920	IL	76,930	IL	67,470
3	IL	44,800	IN	37,100	OH	67,130	IN	61,600
4	IN	28,800	IL	36,750	IN	53,900	MO	50,160
5	AR	20,460	GA	25,575	AR	32,870	AR	13,500
6	NC	19,200	NC	22,040	GA	19,800	KY	10,880
7	GA	14,025	AR	18,240	TN	18,620	VA	8,618
8	VA	12,250	AL	12,800	NC	14,000	NC	8,525
9	KY	10,800	SC	12,470	KY	13,825	TN	8,370
10	SC	8,525	VA	10,545	VA	10,582	GA	3,645

Source: USDA-NASS, MASS.

Figure 16:

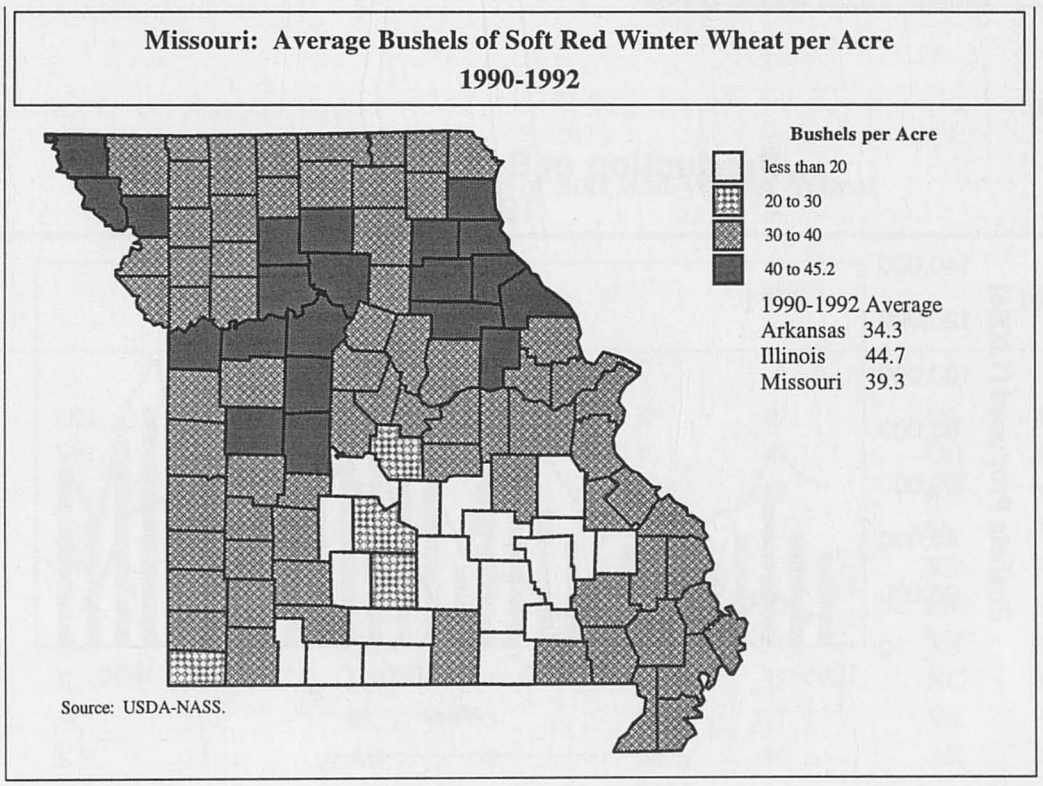
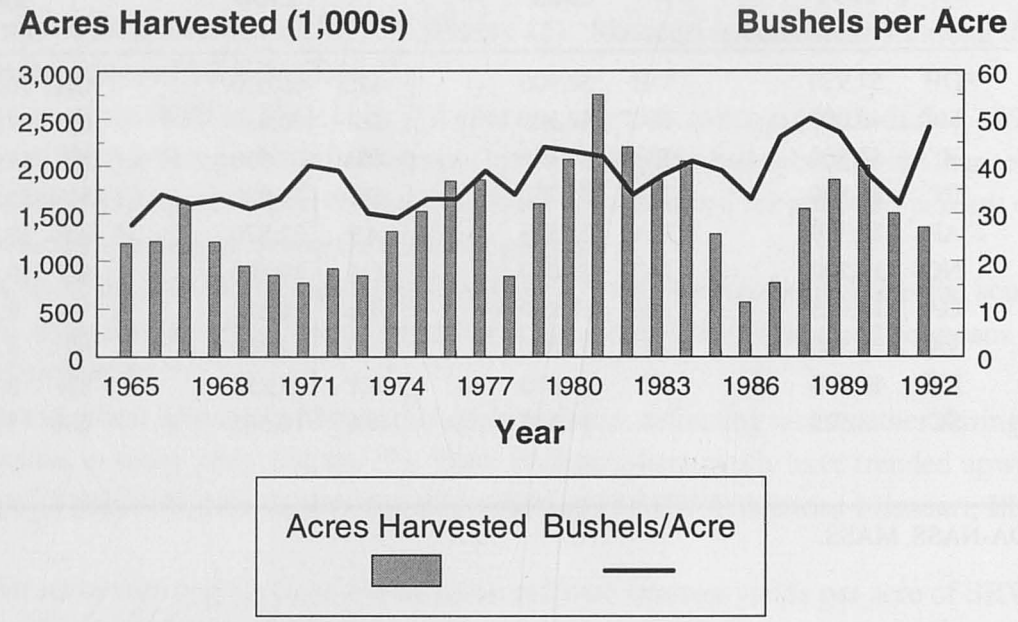


Figure 17:

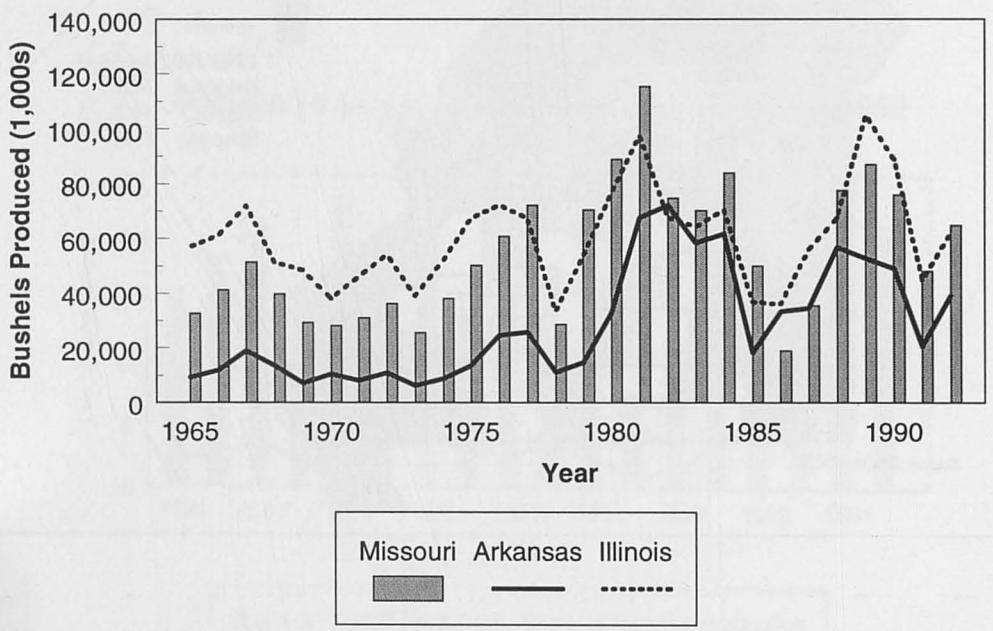
Missouri: Acres Harvested and Bushels per Acre of Winter Wheat, 1965-1992



Source: USDA-NASS, MASS.

Figure 18:

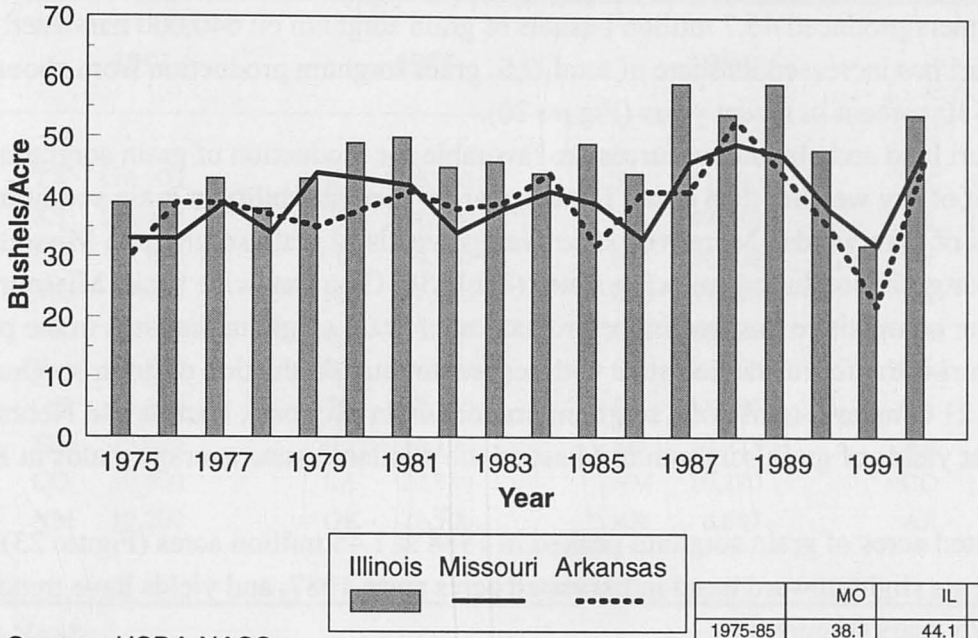
Production of Soft Red Winter Wheat, 1965-1992



Source: USDA-NASS.

Figure 19:

Yield per Acre of Soft Red Winter Wheat, 1975-1992



	MO	IL	AR
1975-85 Avg	38.1	44.1	37.5
1985-92 Avg	41.5	49.9	39.3

Source: USDA-NASS.

Table 4:

Top Ten Bushels per Acre of Soft Red Winter Wheat

	1991		1985		1980		1975	
1	OH	49	OH	62	IN	49	IN	44
2	VA	49	IN	53	IL	49	OH	42
3	IN	40	IL	49	OH	49	IL	39
4	NC	40	IA	48	MO	43	IA	34
5	IA	34	MO	39	KY	39.5	KY	34
6	GA	33	VA	37	IA	38	MO	33
7	MO	32	KY	34	AR	38	TN	31
8	IL	32	LA	34	TN	38	NC	31
9	SC	31	FL	33	VA	37	VA	31
10	KY	27	AR	32	SC	36	AR	30

Source: USDA-NASS, MASS.

Grain Sorghum Production

Grain sorghum is not as popular with Missouri grain producers as corn and soybeans. In 1993 Missouri farmers produced 46.7 million bushels of grain sorghum on 640,000 harvested acres.

Missouri has increased its share of total U.S. grain sorghum production from about 5 percent in the 1960s to 10 percent in recent years (Figure 20).

Missouri land and climate resources are favorable for production of grain sorghum, which is more tolerant of dry weather than corn. Hence, year-to-year variability in grain sorghum yields is less than that of corn yields. Moreover, state average yields of grain sorghum in Missouri are among the highest for grain-sorghum-producing states (Table 5). On a statewide basis, Missouri is in a much stronger competitive position in the production of grain sorghum than it is in the production of corn. Missouri is the fourth-ranked state with respect to total production of grain sorghum (Table 6).

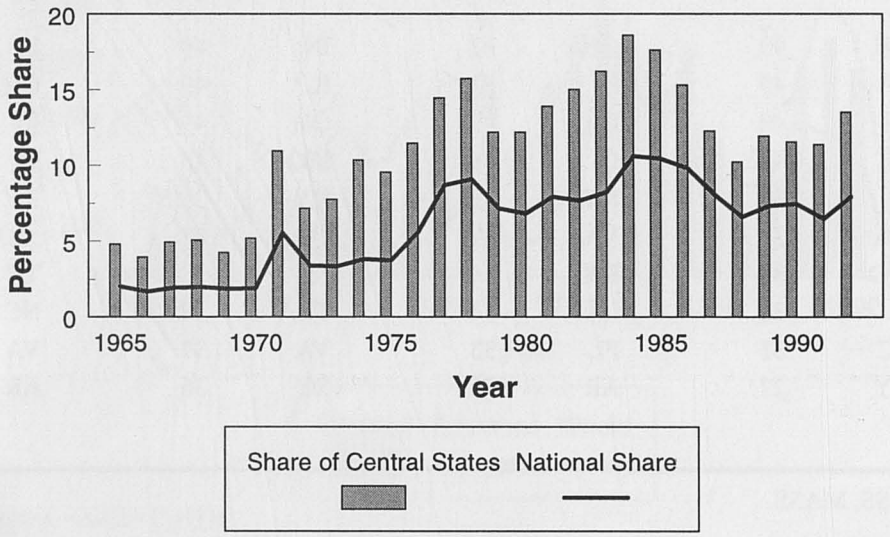
Figure 21 compares total grain sorghum production in Missouri, Kansas and Nebraska. Figure 22 shows that yields of grain sorghum in Missouri are similar to state average yields in Kansas and Illinois.

Harvested acres of grain sorghum peaked in 1988 at 1.45 million acres (Figure 23). However, there has been a slight upward trend in harvested acres since 1987, and yields have trended upward for the past 25 years (Figure 23).

Grain sorghum is produced in 74 of Missouri's 114 counties (Figure 24). County average yields range from 15.3 bushels per acre in Washington County to 102.8 bushels per acre in Audrain County in 1992. The dark shaded counties in Figure 24 account for about 5 percent of total U.S. production. Average yields in these counties compare favorably with yields in other major grain-sorghum-producing states. Thus, Missouri is likely to remain a major producer of grain sorghum in the future.

Figure 20:

Missouri's Share of Grain Sorghum Production, 1965-1992



Central states include AR, IL, IA, KS, MO, and NE.

Source: USDA-NASS.

Table 5:

Top Ten Grain-Sorghum-Producing States
(1,000 bushels)

	1991		1985		1980		1975	
1	TX	176,900	KS	296,700	TX	181,700	TX	374,400
2	KS	176,400	TX	241,900	KS	149,640	KS	147,000
3	NE	85,800	NE	154,400	NE	121,800	NE	104,500
4	MO	37,440	MO	117,030	MO	39,840	MO	28,090
5	AR	15,390	AR	66,240	OK	16,320	OK	19760
6	IL	13,840	MS	39,680	CO	12,250	NM	15,500
7	OK	13,500	TN	37,200	CA	11,096	CA	14,904
8	SD	13,020	IL	36,190	SD	10,725	AR	9,800
9	CO	10,800	LA	27,880	NM	10,280	CO	7,540
10	NM	10,200	OK	22,500	AR	5,887	AZ	6,800

Source: USDA-NASS.

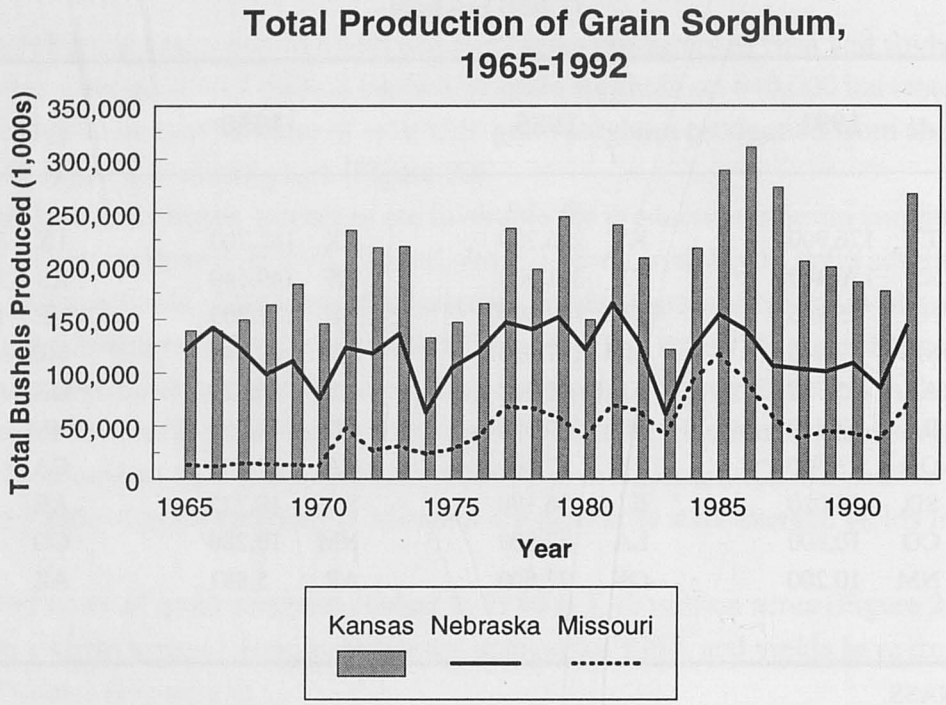
Table 6:

Top Ten Bushels per Acre of Grain Sorghum

	1991		1985		1980		1975	
1	IL	80	MO	83	AZ	80	CA	72
2	KY	73	CA	83	CA	73	AZ	68
3	MO	72	AZ	81	IA	70	IL	68
4	NE	66	TN	80	NE	60	KY	65
5	TN	65	KY	80	IL	59	IA	62
6	MS	62	NE	80	IN	52	IN	60
7	TX	61	IL	77	PA	50	NE	55
8	NM	60	AR	72	KY	50	MO	53
9	AR	57	KS	69	MO	48	TX	52
10	KS	56	LA	68	TX	46	NM	50

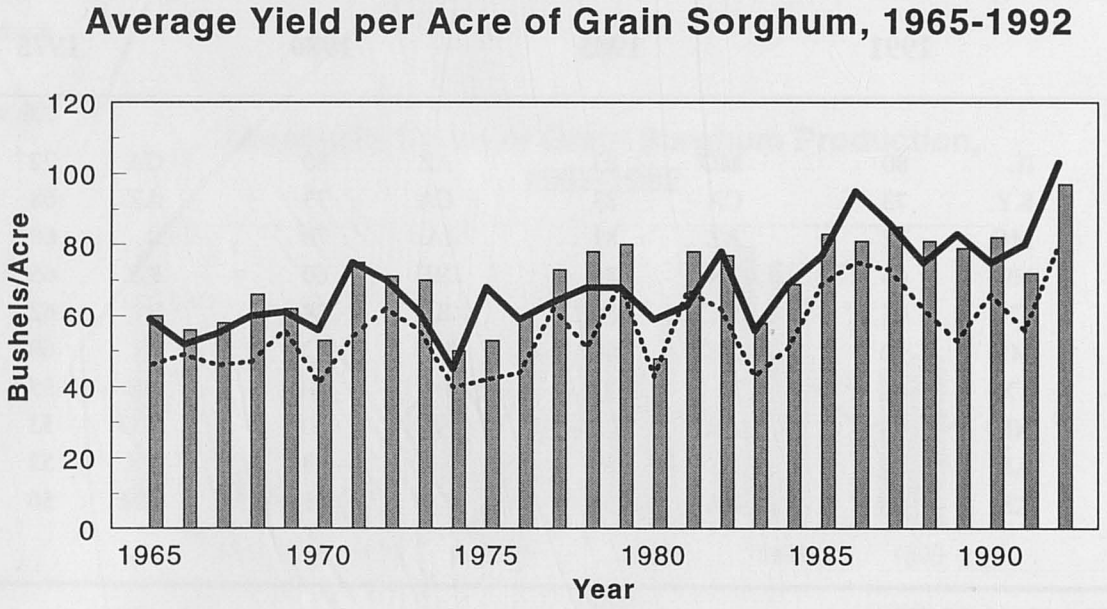
Source: USDA-NASS, MASS.

Figure 21:



Source: USDA-NASS.

Figure 22:

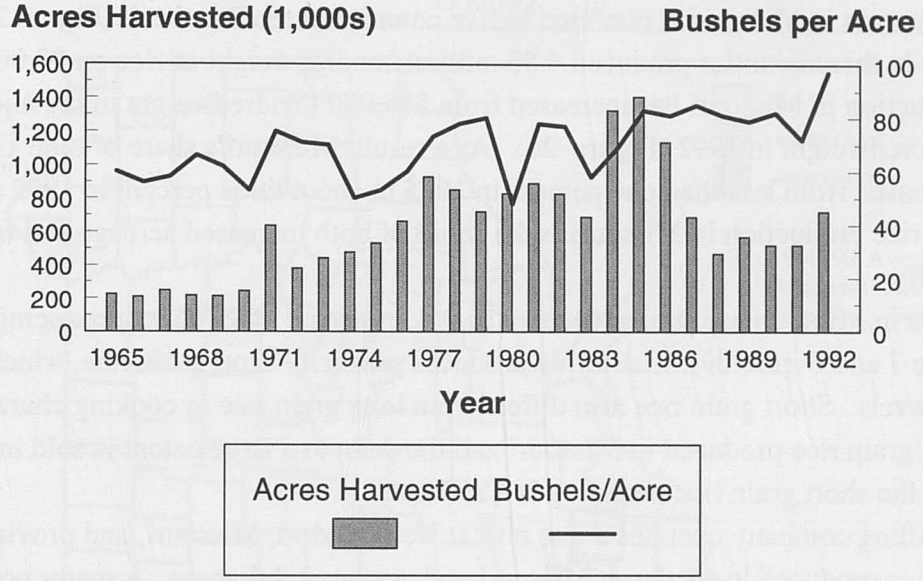


	MO	IL	KS
1965-75 Avg.	61.3	60.2	49
1975-85 Avg.	68.8	66.3	54.8
1985-91 Avg.	82.5	84.25	66.75

Source: USDA-NASS.

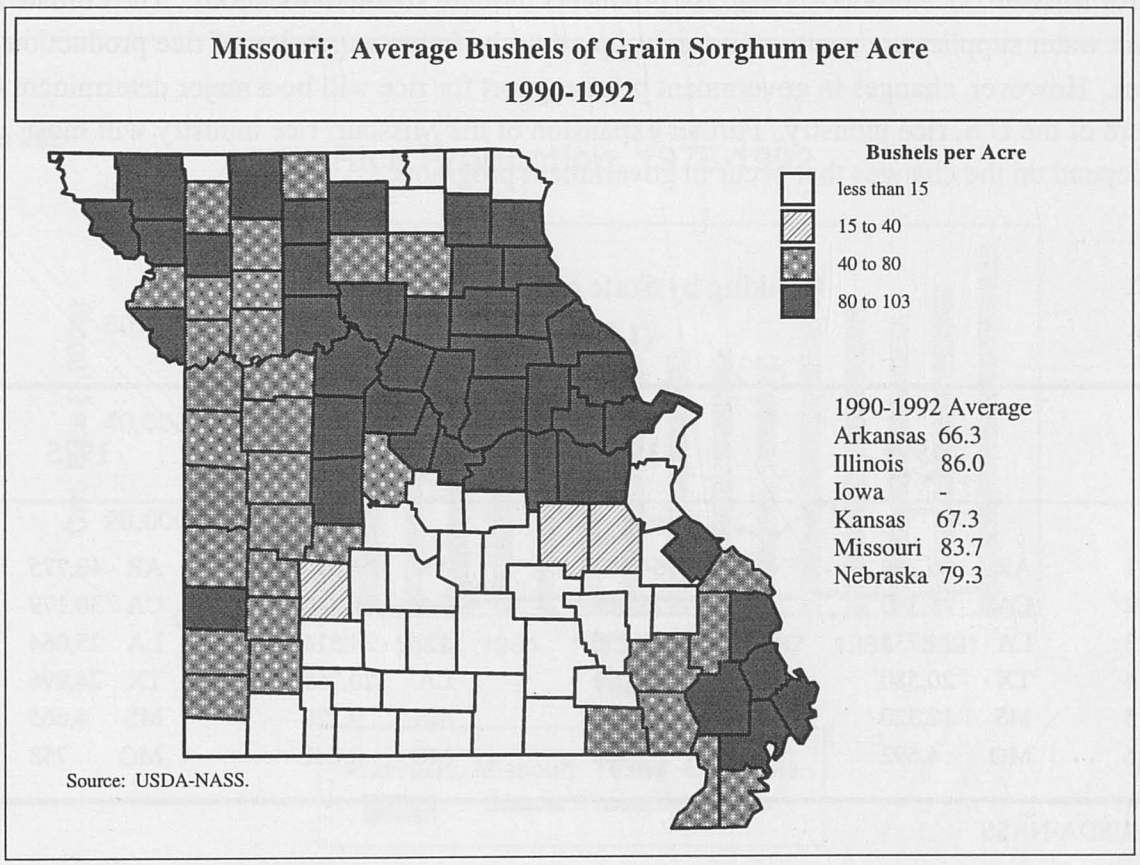
Figure 23:

Missouri: Acres Harvested and Bushels per Acre of Grain Sorghum, 1965-1992



Source: USDA-NASS, MASS.

Figure 24:



Rice Production

Missouri is one of six states that produce rice (Table 7). Long grain rice is the predominant type of rice grown in Missouri.

Rice production in Missouri is confined to five counties in the Bootheel (Figure 25). In 1993 rice farms in these counties produced 4.56 million hundredweight of rice on 93,000 acres.

Rice production in Missouri has increased from 588,000 hundredweight in the mid-1970s to 5.3 million hundredweight in 1992 (Figure 26). As a result, Missouri's share of total U.S. rice production increased from less than one percent in 1975 to about three percent in 1992 (Figure 27). Expanded rice production in Missouri is the result of both increased acreage and increased yield (Figure 28).

Rice yields in Missouri are similar to those in Arkansas and other states producing long grain rice (Table 7 and Figure 29). California produces primarily short grain rice, which has different yield levels. Short grain rice also differs from long grain rice in cooking characteristics. Hence, the long grain rice produced in Missouri and the delta to a large extent is sold in a different market than the short grain rice produced in California.

Dryfus Milling company operates a rice mill at New Madrid, Missouri, and provides a market for the rice produced in southeast Missouri and northeast Arkansas. A major portion of the rice produced in Missouri moves into export markets.

The Missouri Bootheel is on the northern limit of climate and water resources that are amenable to rice production. Because of this, certain types of weed and insect problems are less severe for Missouri rice producers than for producers in more southern locations. The climate and abundant water supplies are positive factors supporting the future expansion of rice production in Missouri. However, changes in government price support for rice will be a major determinant of the future of the U.S. rice industry. Further expansion of the Missouri rice industry will most likely depend on the changes that occur in government programs.

Table 7: **Ranking by State of Rice Production**
(1,000 cwt.)

	1991		1985		1980		1975	
1	AR	66,780	AR	54,597	AR	52,615	AR	40,775
2	CA	25,350	CA	28,468	CA	36,386	CA	30,179
3	LA	24,735	LA	20,256	TX	24,814	LA	25,064
4	TX	20,580	TX	18,071	LA	20,768	TX	24,996
5	MS	12,320	MS	10,058	MS	9,226	MS	6,665
6	MO	4,692	MO	3,463	MO	2,341	MO	758

Source: USDA-NASS.

Figure 25:

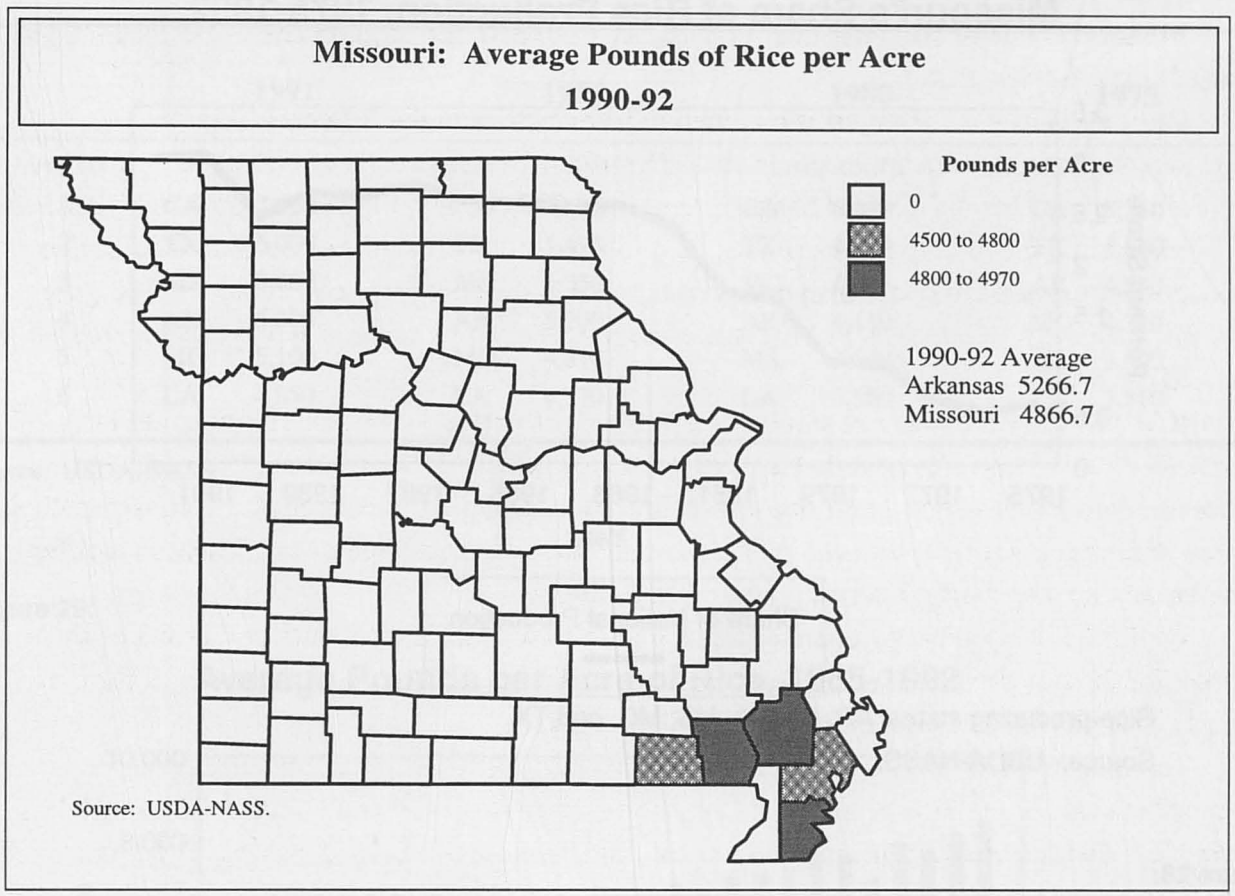
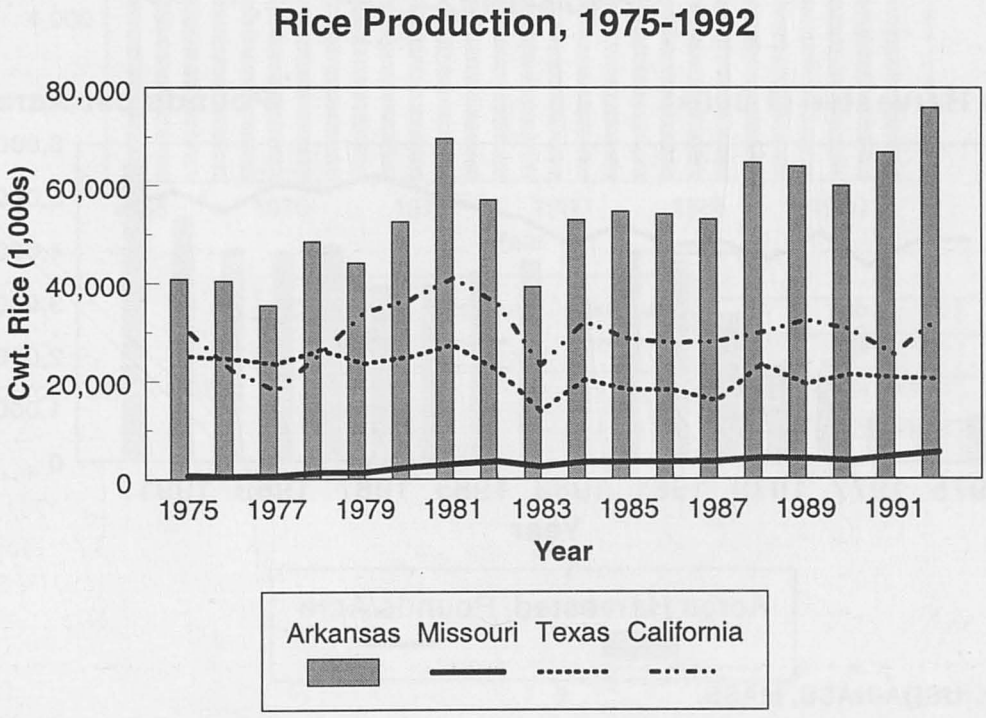


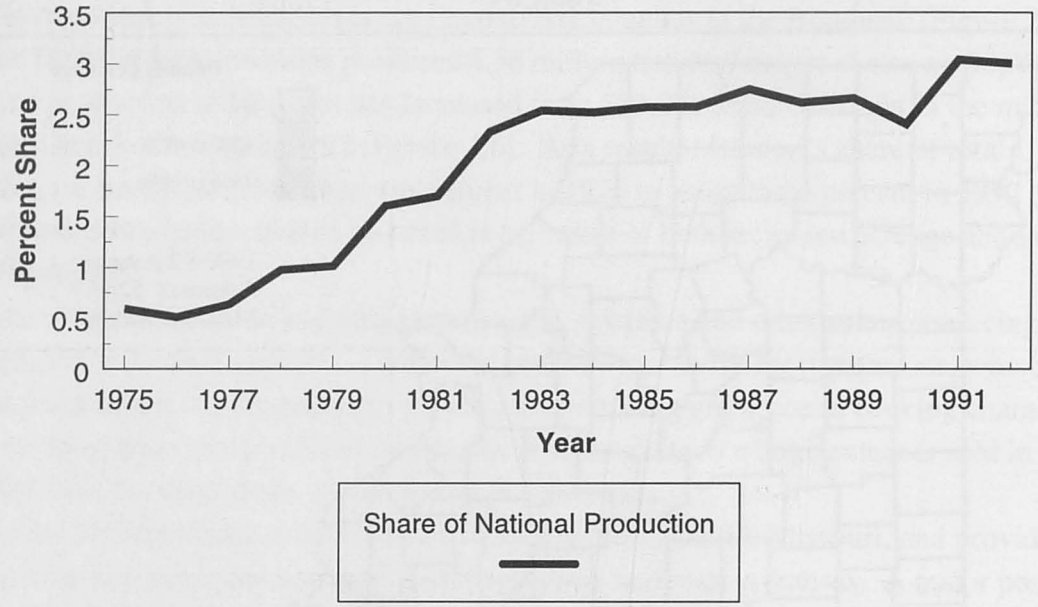
Figure 26:



Source: USDA-NASS.

Figure 27:

Missouri's Share of Rice Production, 1975-1992

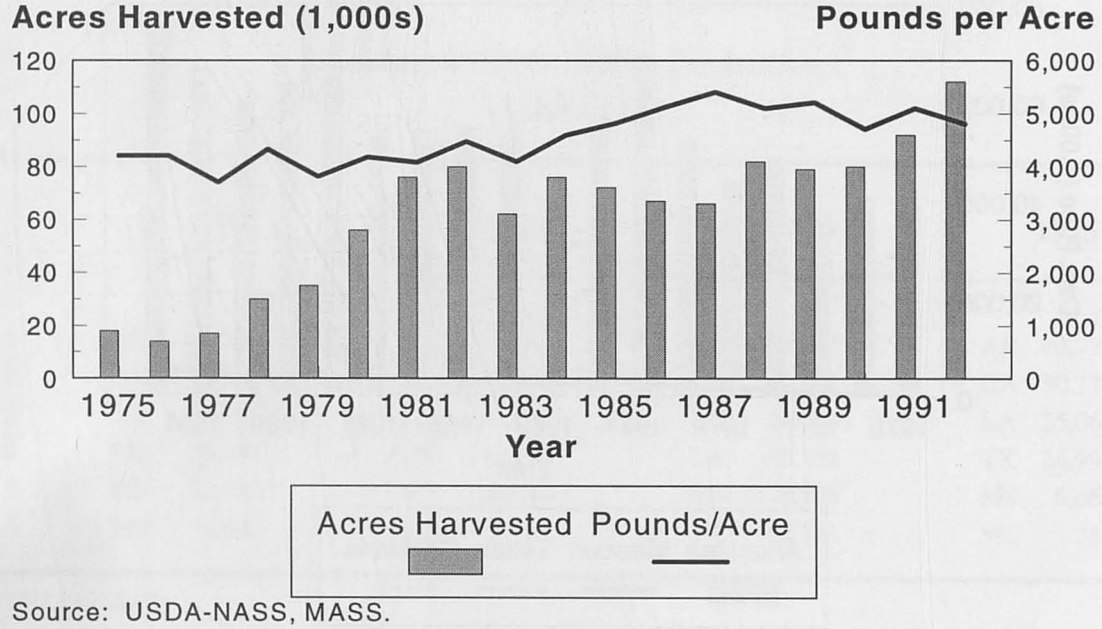


Rice-producing states: AR, CA, LA, MS, MO, and TX.

Source: USDA-NASS.

Figure 28:

Missouri: Acres Harvested and Pounds per Acre of Rice, 1975-1992



Source: USDA-NASS, MASS.

Table 8:

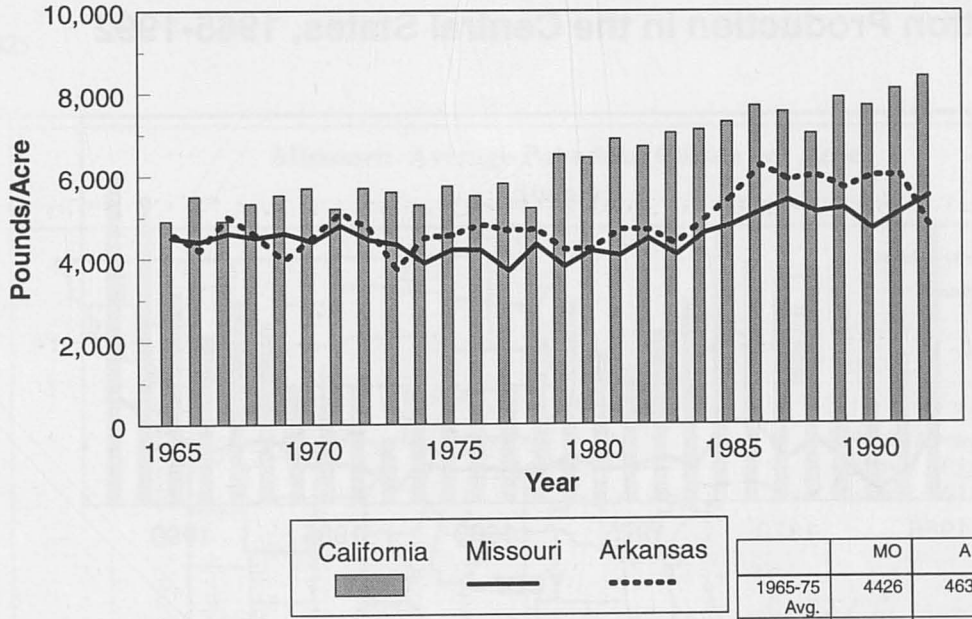
Ranking by State of Pounds per Acre of Rice

	1991		1985		1980		1975	
1	CA	7,800	CA	7,300	CA	6,440	CA	5,750
2	TX	6,000	TX	5,490	TX	4,230	TX	4,560
3	MS	5,600	MS	5,350	MO	4,180	AR	4,540
4	AR	5,300	AR	5,200	AR	4,110	MO	4,210
5	MO	5,100	MO	4,810	MS	3,840	MS	3,900
6	LA	4,850	LA	4,370	LA	3,550	LA	3,810

Source: USDA-NASS.

Figure 29:

Average Pounds per Acre of Rice, 1965-1992



	MO	AR	CA
1965-75 Avg.	4426	4631	5401
1975-85 Avg.	4226.4	4482.7	6392.7
1985-92 Avg.	5116.3	5767.5	7708.8

Source: USDA-NASS.

Cotton Production

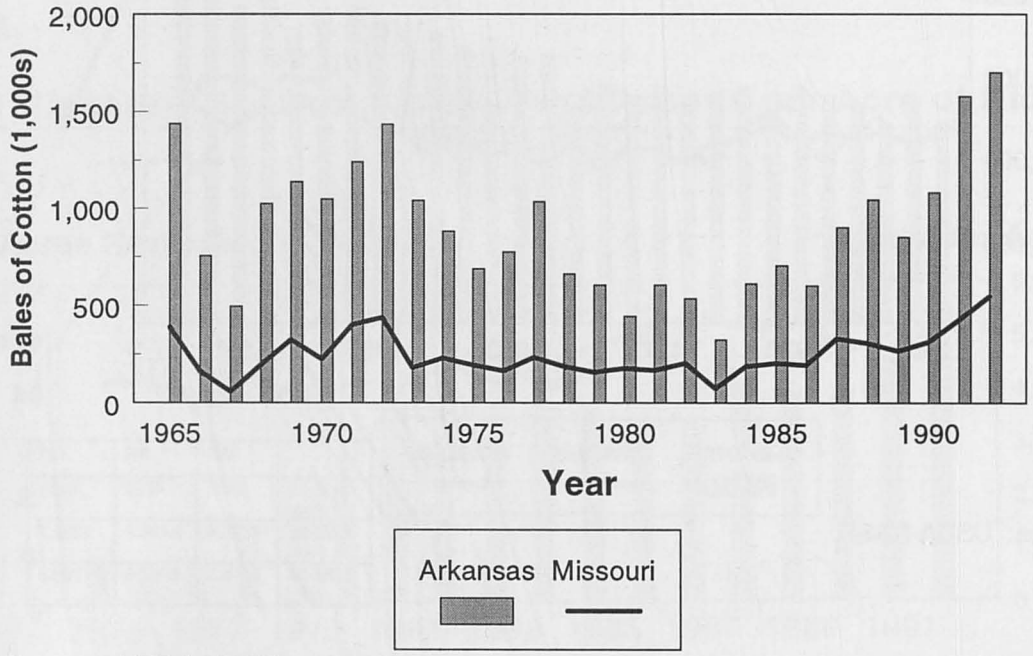
Missouri is one of 17 states that produce upland cotton. In 1993 Missouri produced 376,000 bales of cotton on 335,000 harvested acres. Cotton production has trended upward since 1983 (Figure 30) as a result of both expanded acreage and increasing yields (Figure 31).

Only seven counties in Missouri produce significant amounts of cotton (Figure 32). However, these counties account for 20 to 25 percent of total cotton production in the central states and about 1.5 percent of total U.S. cotton production. Figure 33 shows that Missouri's share of total U.S. cotton production has trended strongly upward since 1983. Figure 34 shows that cotton yields in Missouri are comparable with yields in Arkansas.

The Bootheel is at the northern end of the U.S. cotton growing region. The colder winters in this area relative to other delta states means that Missouri cotton producers have fewer insect problems than their neighbors to the south. Consequently, cotton production in Missouri requires less application of insecticides than in other cotton-producing regions. This translates into a cost advantage for Missouri cotton producers. The cost advantage, coupled with the abundant supply of irrigation water in the Bootheel, places Missouri cotton producers in a strong competitive position.

Figure 30:

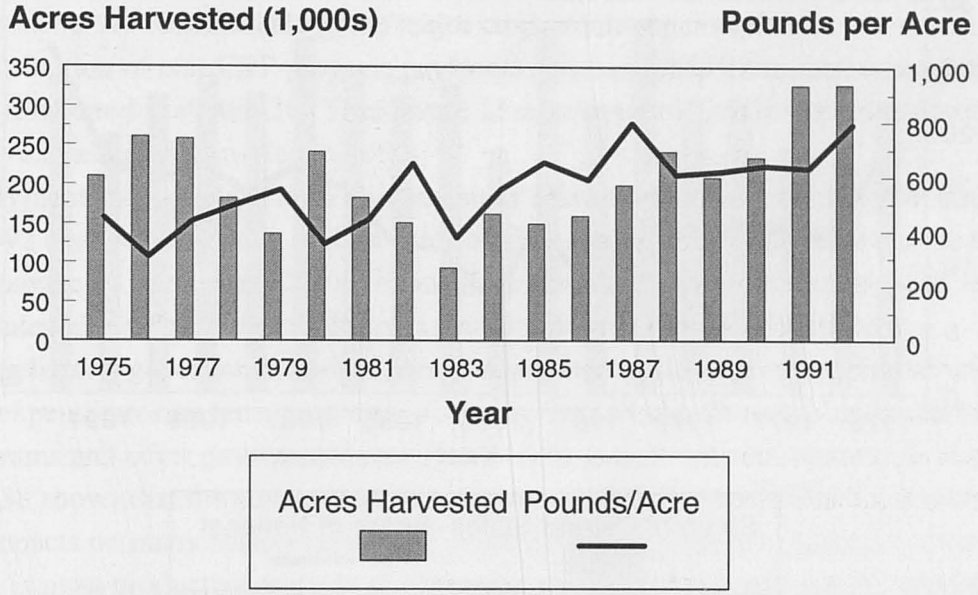
Cotton Production in the Central States, 1965-1992



Source: USDA-NASS.

Figure 31:

Missouri: Acres Harvested and Pounds per Acre of Cotton, 1975-1992



Source: USDA-NASS, MASS.

Figure 32:

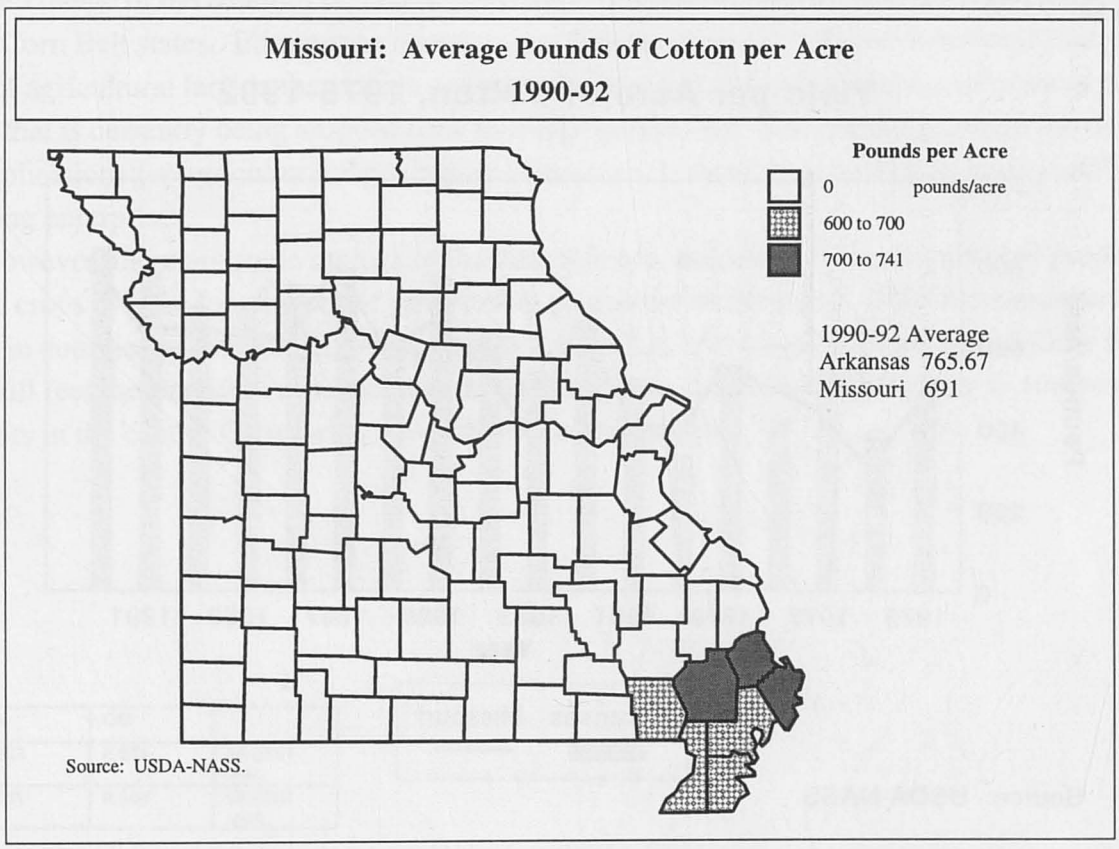
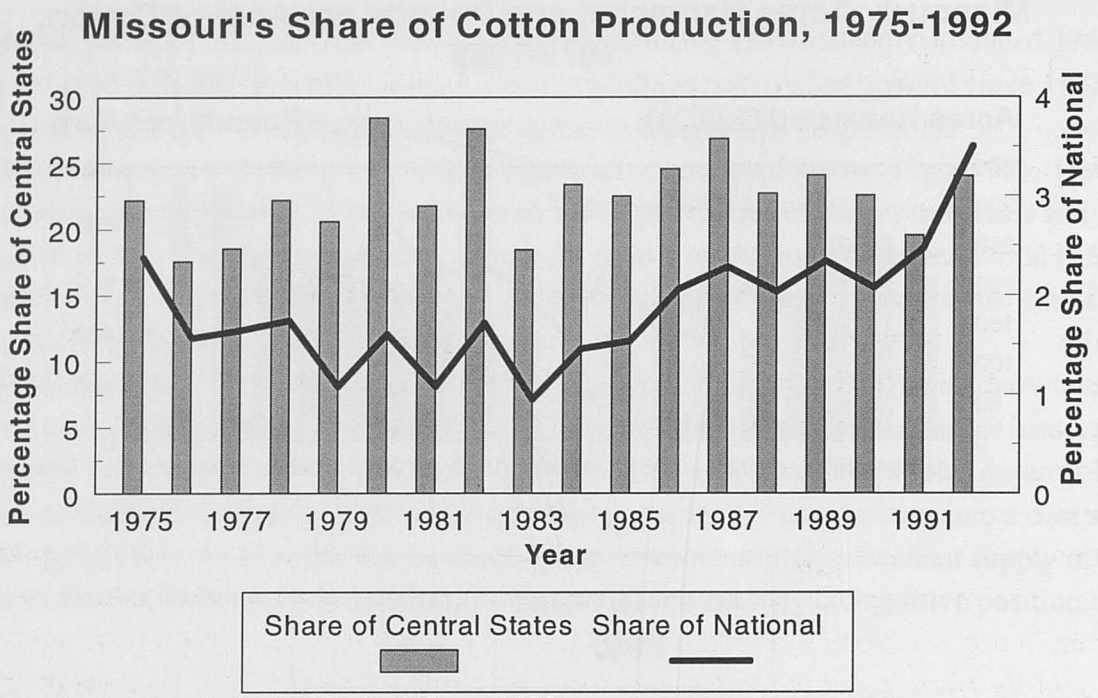
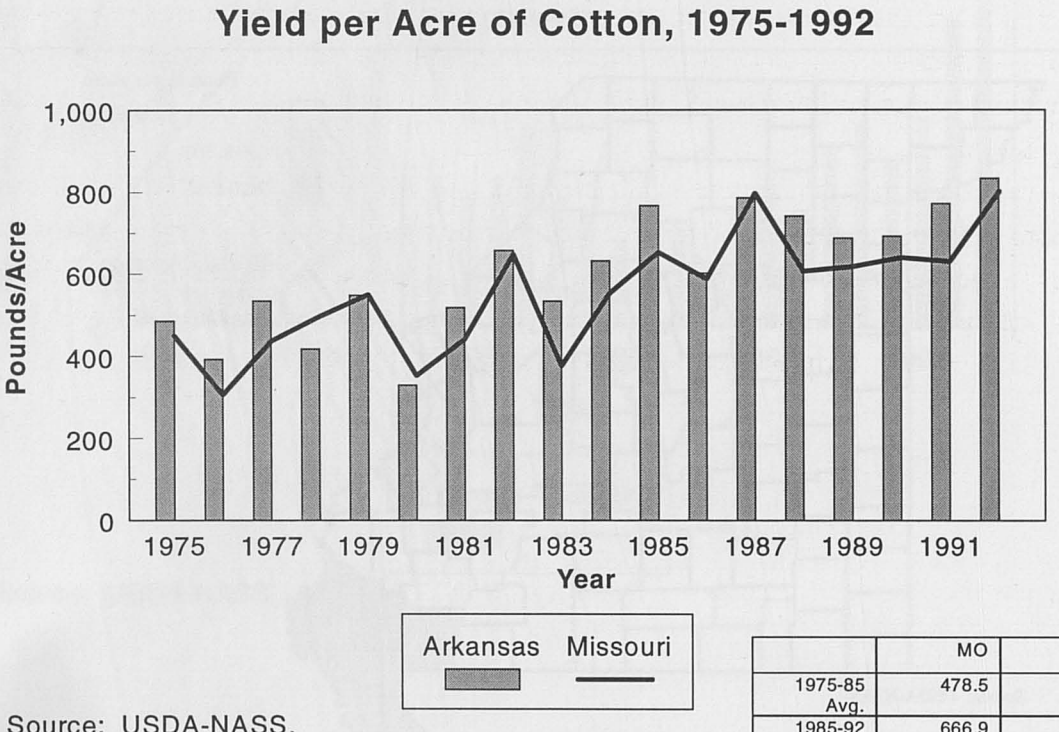


Figure 33:



Central states include AR, IL, KS, and MO.
Source: USDA-NASS.

Figure 34:



	MO	AR
1975-85 Avg.	478.5	528.7
1985-92 Avg.	666.9	735.1

Source: USDA-NASS.

Government Payments

Government payments to Missouri farmers totaled $179.1 million in 1992. This includes approximately $58.6 million in Conservation Reserve Program (CRP) payments. Figure 35 shows that these payments are concentrated in the major crop-producing counties.

The distribution of non-CRP program payments (disaster, crop loans, and acreage reduction programs) is illustrated in Figure 36. There were 23 counties in which government payments (excluding CRP) exceeded $1.5 million in 1992.

CRP payments were a significant component of Missouri farm income in 1992. Figure 37 shows the 1992 distribution of one million acres of CRP land in Missouri. Figure 38 shows that government payments (including CRP) accounted for more than 35 percent of net cash receipts from agricultural sales in several northern Missouri counties with heavy CRP enrollment.

Growing federal government budget pressures are expected to intensify efforts to reduce government expenditures on farm programs. Consequently, many observers expect that grain price support programs and other government activities will be phased out over the next 5-10 years.

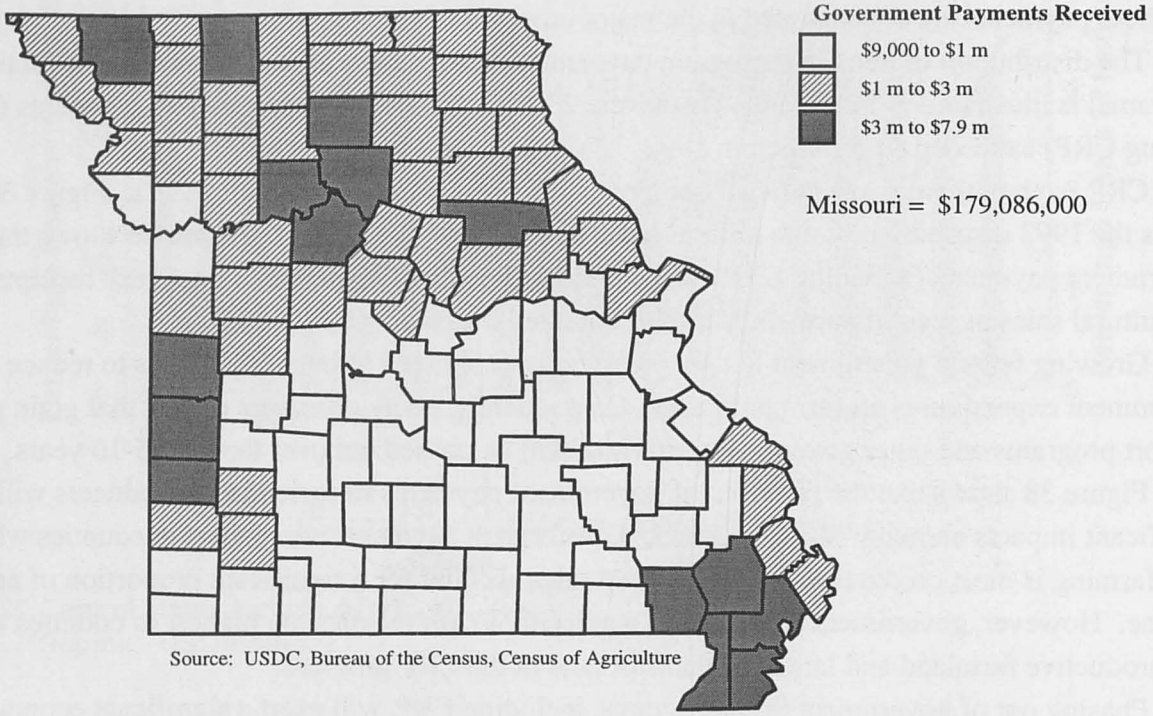
Figure 38 shows that the phaseout of government payments to agricultural producers will have significant impacts on many Missouri farms. Government payments are highest in counties where crop farming is most productive and where crop sales account for a significant proportion of area income. However, government payments as a percent of cash receipts are highest in counties with less productive farmland and larger amounts of land in the CRP program.

Phasing out of government farm programs, including CRP, will exert a significant economic force for change in the counties that have crop yields considerably lower than average yields of the central Corn Belt states. Elimination or reduction of these programs will put downward pressure on prices of agricultural land in these acres and provide strong incentives to convert substantial portions of land that is currently being cropped back to forage production. This pending change has significant implications for agricultural input supply companies in these areas as well as grain handling and marketing enterprises.

However, there are some regions of the state that are, and will remain, competitive producers of grain crops even in the absence of government price support programs. Missouri producers located in counties where annual average yields are similar to average yields in central Corn Belt states will feel the impact of reduced government programs. However, their ability to compete with producers in the central Corn Belt states will not be undermined.

Figure 35:

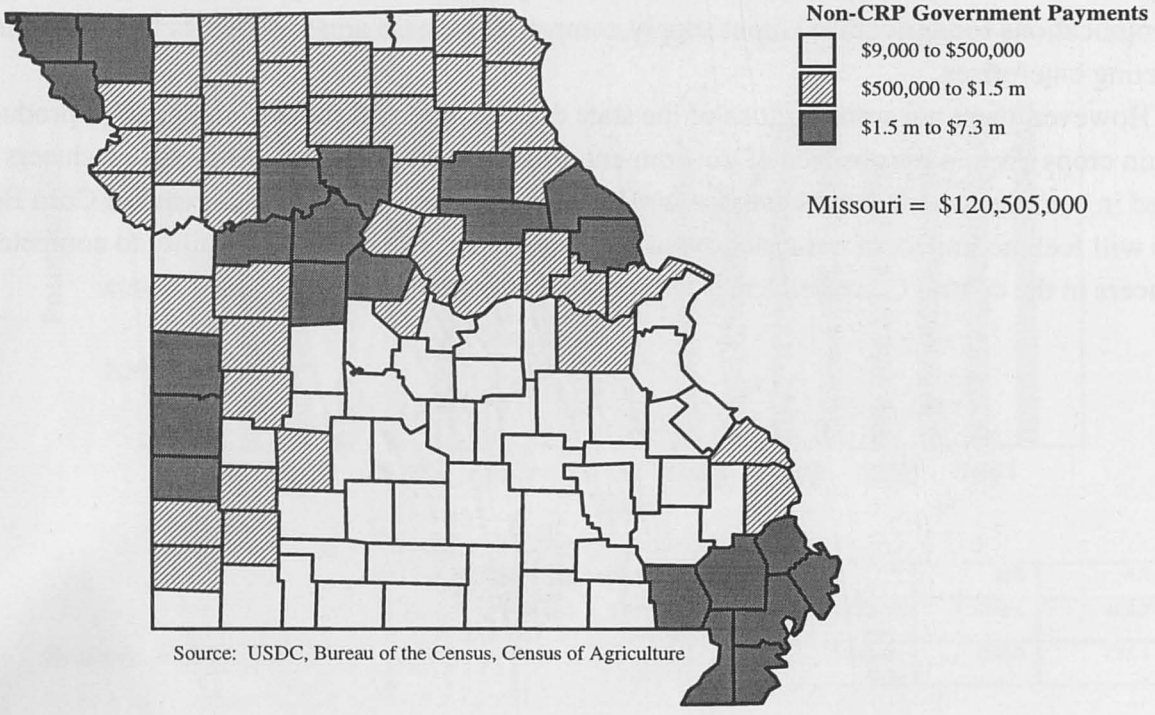
Missouri: Total Government Payments Received
1992



Source: USDC, Bureau of the Census, Census of Agriculture

Figure 36:

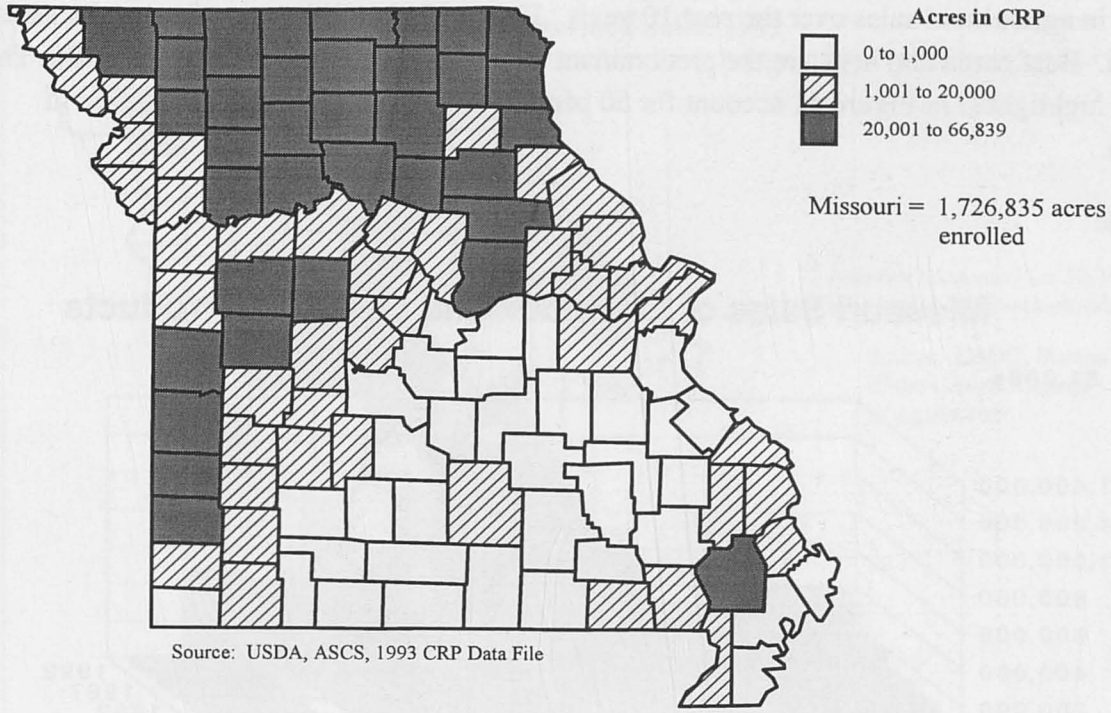
Missouri: Non-CRP Government Payments Received
1992



Source: USDC, Bureau of the Census, Census of Agriculture

Figure 37:

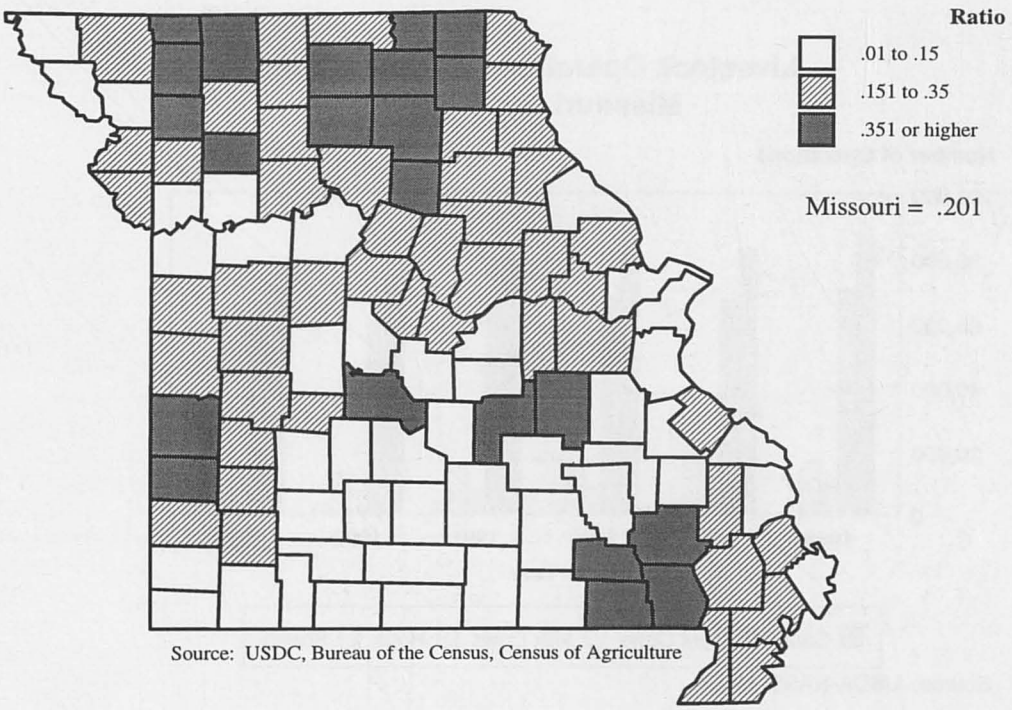
Missouri: Land in the Conservation Reserve Program (CRP) 1993



Source: USDA, ASCS, 1993 CRP Data File

Figure 38:

Missouri: Ratio of Total 1992 Government Agricultural Payments to 1992 Net Cash Return from Agricultural Sales

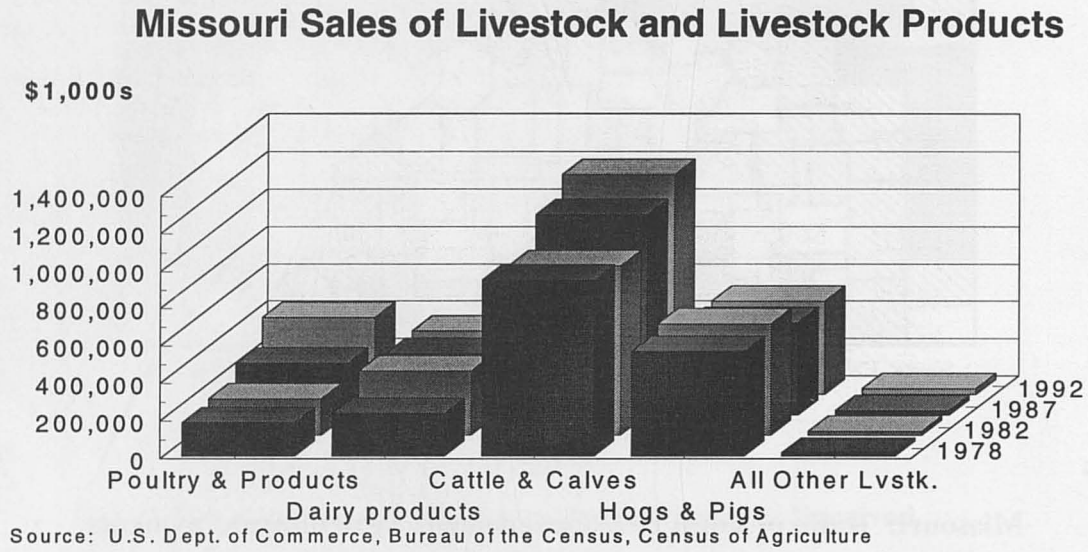


Source: USDC, Bureau of the Census, Census of Agriculture

Livestock and Poultry Production

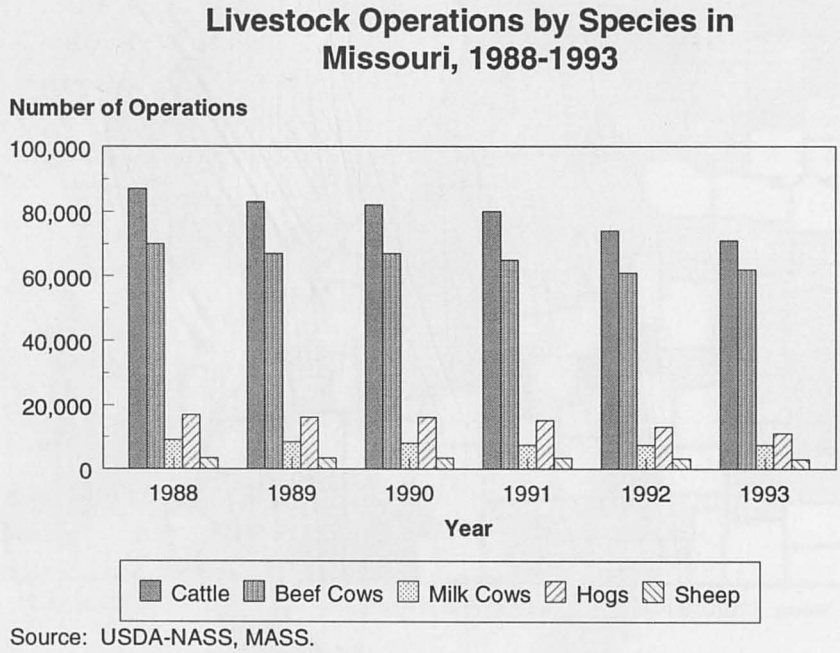
Livestock and poultry production accounted for 56 percent of the value of agricultural production in Missouri in 1993. Expanded production of poultry and swine has been the major source of increase in agricultural sales over the past 10 years. Figure 39 shows the mix of livestock sales in Missouri. Beef cattle and hogs are the predominant species on Missouri farms (Figure 40). The 27 counties highlighted in Figure 41 account for 50 percent of the total livestock production in Missouri.

Figure 39:



Source: U.S. Dept. of Commerce, Bureau of the Census, Census of Agriculture

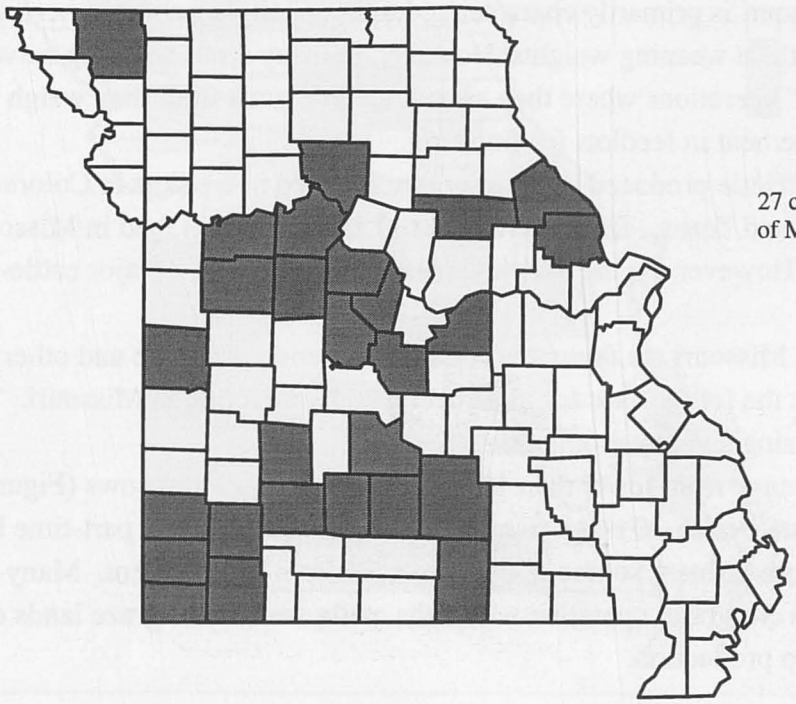
Figure 40:



Source: USDA-NASS, MASS.

Figure 41:

Counties Accounting for Fifty Percent of Missouri's Livestock Sales, 1992



27 counties accounted for 50.38% of Missouri's total livestock sales

Source: USDC, Bureau of the Census, Census of Agriculture

Beef Cattle Production

Missouri ranks second in the number of beef cows on farms. There were 2.0 million beef cows on Missouri farms January 1, 1993 (Table 9).

The heaviest concentration of beef cows exists in the southwestern section of the state (Figure 42). However, the north central section also has substantial numbers of beef cattle.

Beef production in Missouri is primarily characterized as cow-calf operations where steers and heifers are sold as stocker cattle at weaning weights. However, in many cases weaning calves are continued in "backgrounding" operations where they are retained on grass until they weigh 700-800 pounds and are ready for placement in feedlots for finishing.

Most feeder and stocker cattle produced in Missouri are finished in feedlots in Colorado, Kansas, Nebraska, Oklahoma and Texas. There were about 125,000 cattle on feed in Missouri on January 1, 1994 (Figure 43). However, Figure 44 shows that Missouri is not a major cattle-feeding state.

The soils and climate of Missouri are favorable for the production of fescue and other cool-season grasses, which provide the forage base for most beef cattle production in Missouri. This forage base provides both grazing and hay production.

Beef herds in Missouri range from fewer than 10 cows to several hundred cows (Figure 45). The average beef herd in the state is 25-30 cows (Figure 46) and is operated on a part-time basis by a retired person or a person whose primary source of income is off-farm employment. Many beef herds in Missouri are part of a crop farm operation where the cattle are used to graze lands on the farm that are not suited to crop production.

Table 9: **Beef Cattle on Farms, January 1**
(1,000 head)

1993		1990		1985		1980		1975	
TX	5,570	TX	5,210	TX	5,586	TX	5,585	TX	6,895
MO	2,070	MO	1,964	OK	2,000	MO	2,278	MO	2,759
OK	1,895	OK	1,880	MO	2,000	OK	2,161	OK	2,713
NE	1,783	NE	1,755	NE	1,868	NE	1,950	NE	2,374
SD	1,542	SD	1,505	SD	1,627	IA	1,751	SD	2,116
MT	1,460	KS	1,390	MT	1,513	KS	1,716	KS	1,978
KS	1,350	MT	1,328	KS	1,512	SD	1,527	IA	1,835
KY	1,115	IA	1,122	IA	1,275	MT	1,427	MT	1,692
IA	1,110	FL	1,083	FL	1,161	FL	1,173	FL	1,468
FL	1,070	KY	1,040	TN	1,050	KY	1,106	MS	1,458

Source: USDA-NASS, MASS.

Figure 42:

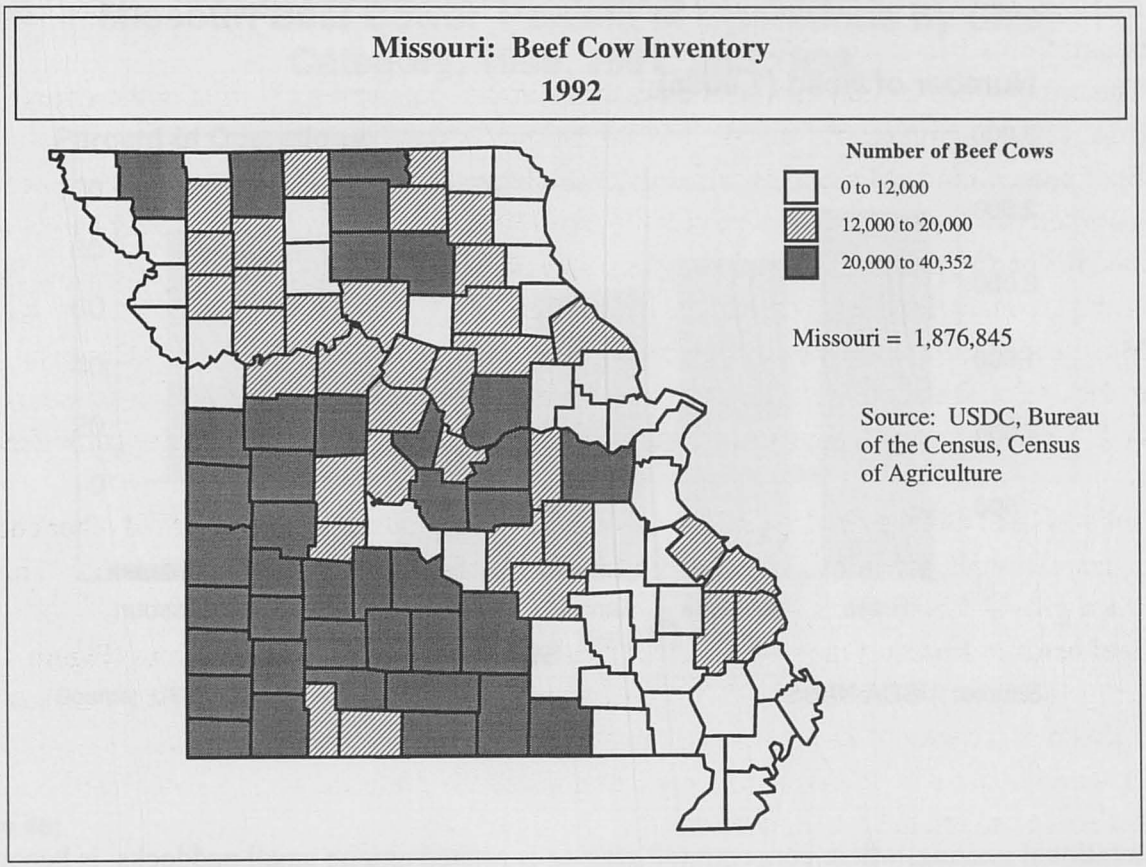
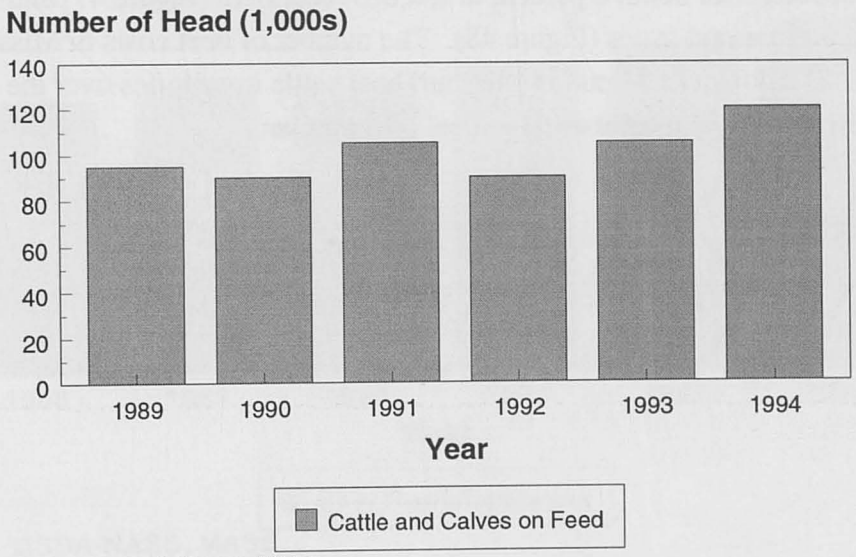


Figure 43:

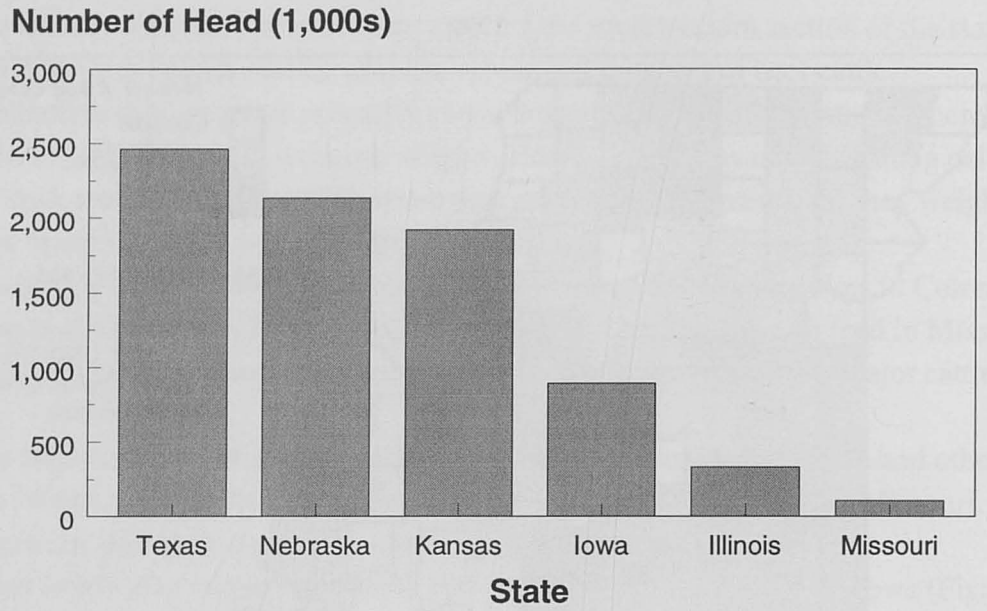
Missouri: January 1 Inventories of Cattle and Calves on Feed, 1989-1994



Source: USDA-NASS, MASS.

Figure 44:

Cattle and Calves on Feed, January 1, 1993



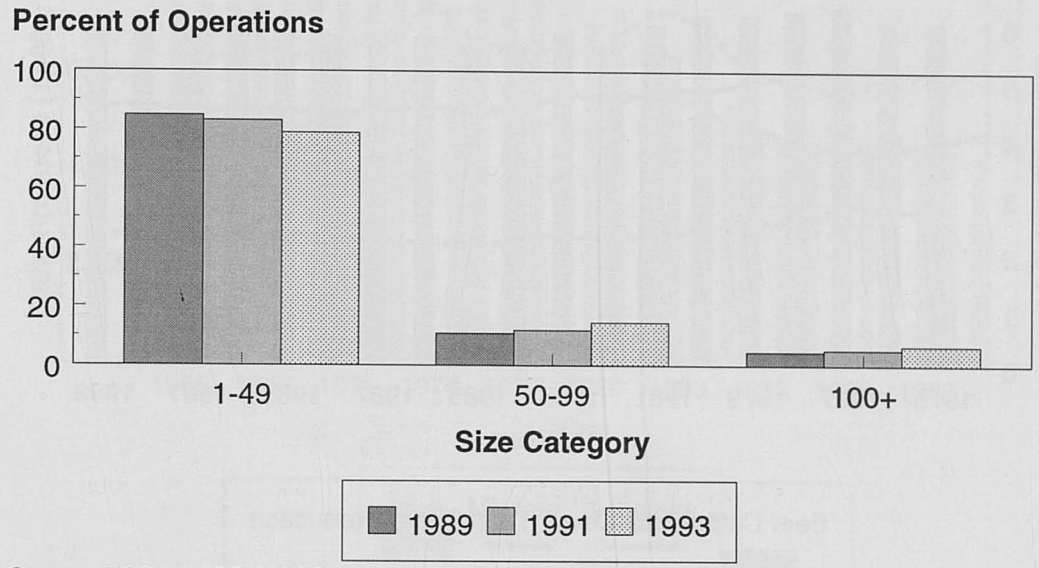
Source: USDA-NASS.

Rotational grazing, where concentrated grazing is rotated among small paddocks, is becoming more widely used for beef production in Missouri. This method of grazing provides opportunities for more effective use of the forage base with cattle typically grazing on higher quality forage than is the case with more traditional methods of grazing. This type of grazing management system, coupled with a transfer of additional land out of crop farming over the next several years will provide a basis for further expansion of beef production in Missouri.

Missouri accounts for about 6 percent of the U.S. beef herd (Figure 47) and about 25 percent of the beef cows in the central states (Figure 48). The number of beef cows in Missouri peaked in 1975 (Figure 49). The downward trend in Missouri beef cattle inventories over the 1975-1987 period reflects the national long-term cycle in beef cow numbers.

Figure 45:

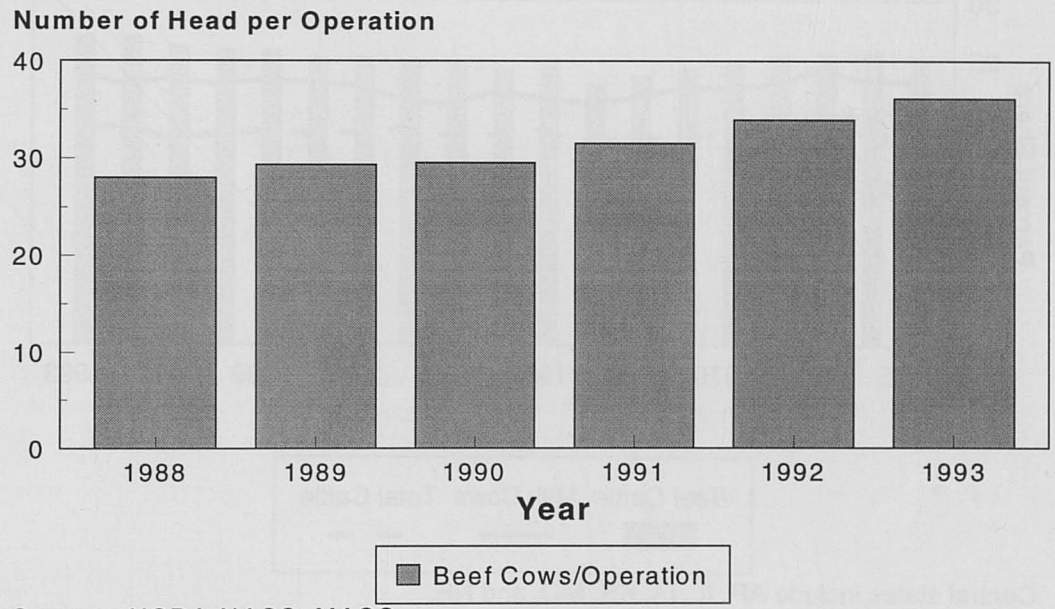
Missouri Beef Cows: Percent of Operations by Size Category, 1989, 1991, and 1993



Source: USDA-NASS, MASS.

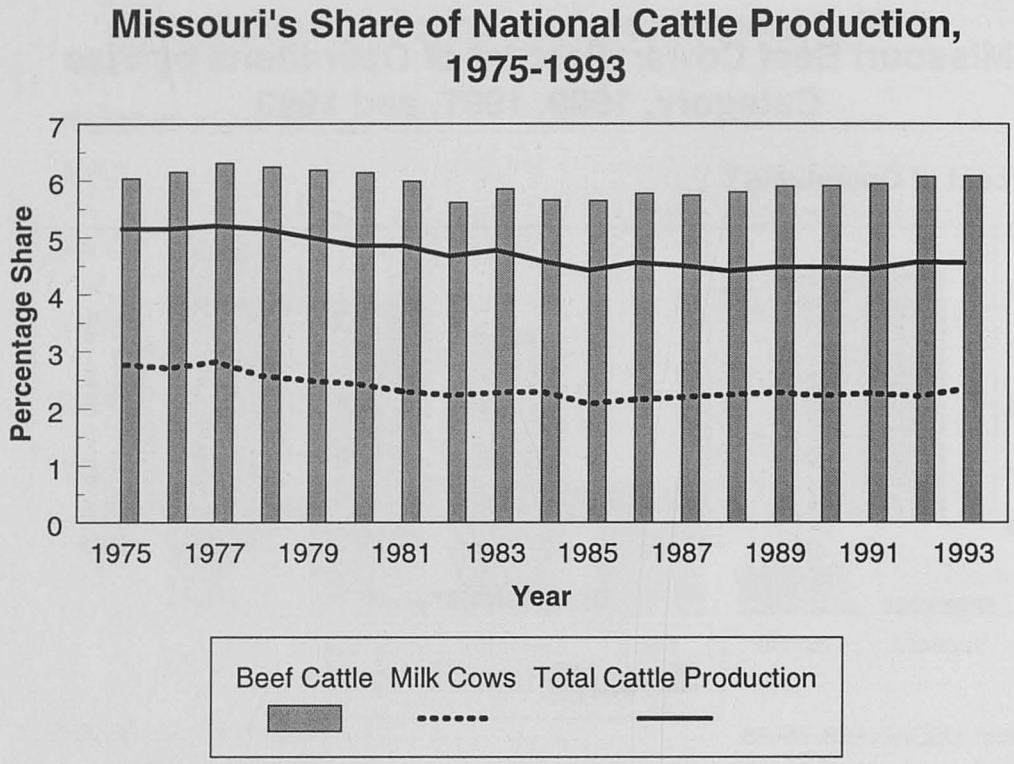
Figure 46:

Missouri: Average Number of Beef Cows per Operation, 1988-1993



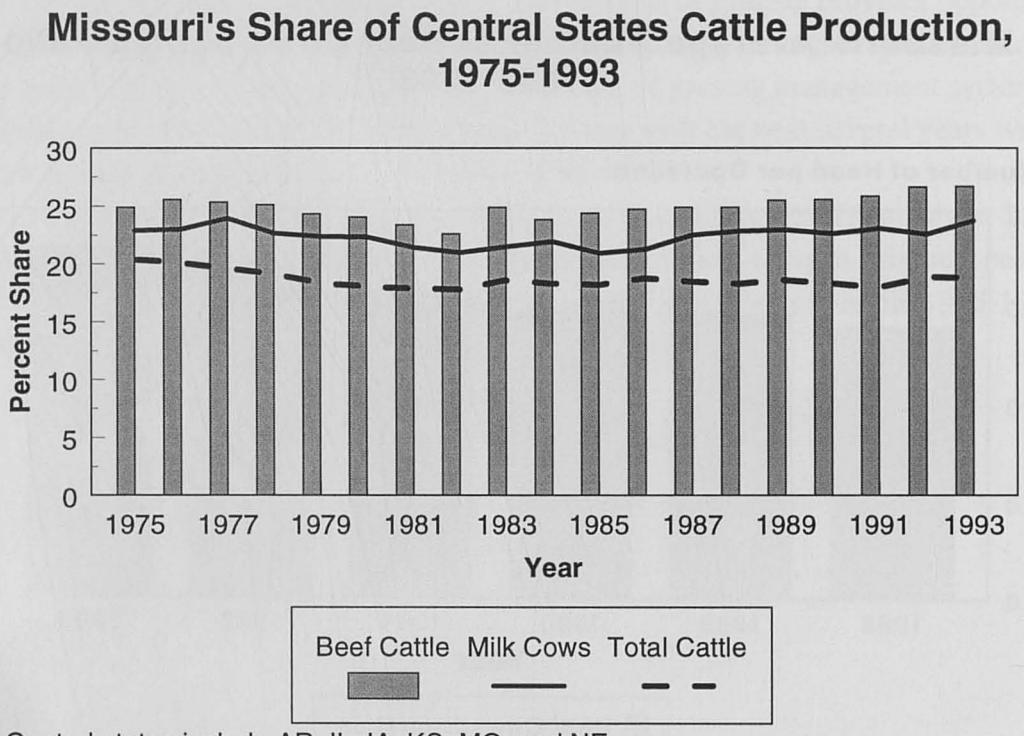
Source: USDA-NASS, MASS.

Figure 47:



Source: USDA-NASS.

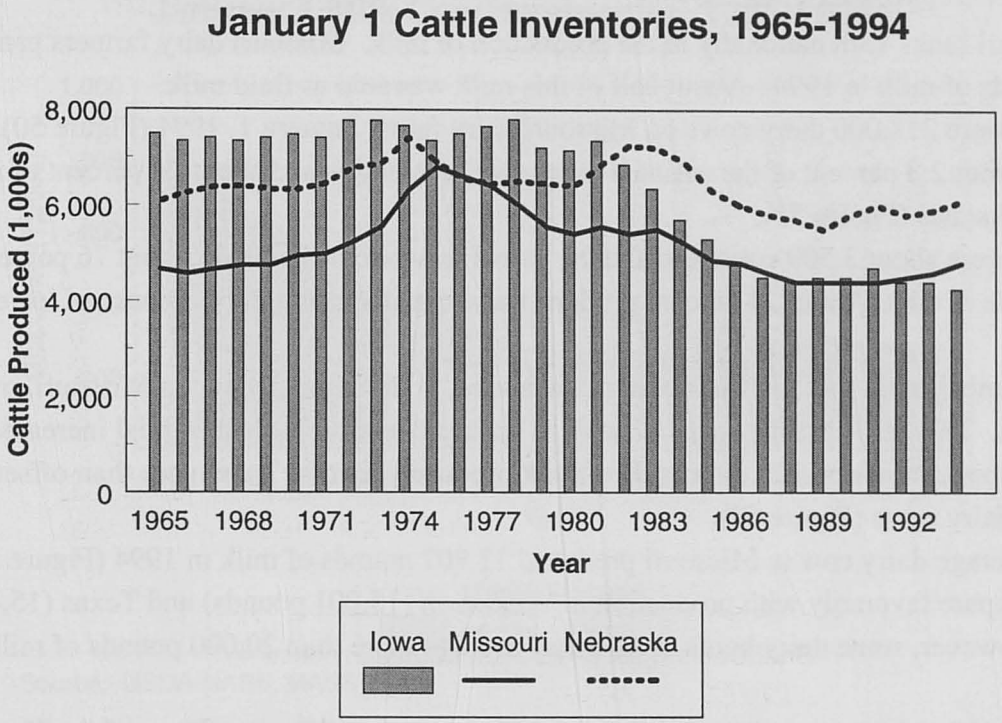
Figure 48:



Central states include AR, IL, IA, KS, MO, and NE.

Source: USDA-NASS.

Figure 49:



Source: USDA-NASS, MASS.

Milk Production

Missouri ranks 13th nationally in the production of milk. Missouri dairy farmers produced 2.7 billion pounds of milk in 1994. About half of this milk was sold as fluid milk.

There were 218,000 dairy cows on Missouri dairy farms January 1, 1994 (Figure 50). This represents about 2.3 percent of the national dairy cow inventories and about 24 percent of milk cows in the central states (Figure 51).

There were about 3,500 commercial dairy farms in Missouri in 1994. About 76 percent of these produce grade A milk. About 24 percent produce only manufacturing milk because of lower quality facilities.

The number of dairy cows has trended downward, both nationally and in Missouri, over the past 25 years. This reflects economies of scale in milk production and substantial increases in productivity per cow. Increases in pounds of milk produced per cow have more than offset declining numbers of dairy cows (Figure 52).

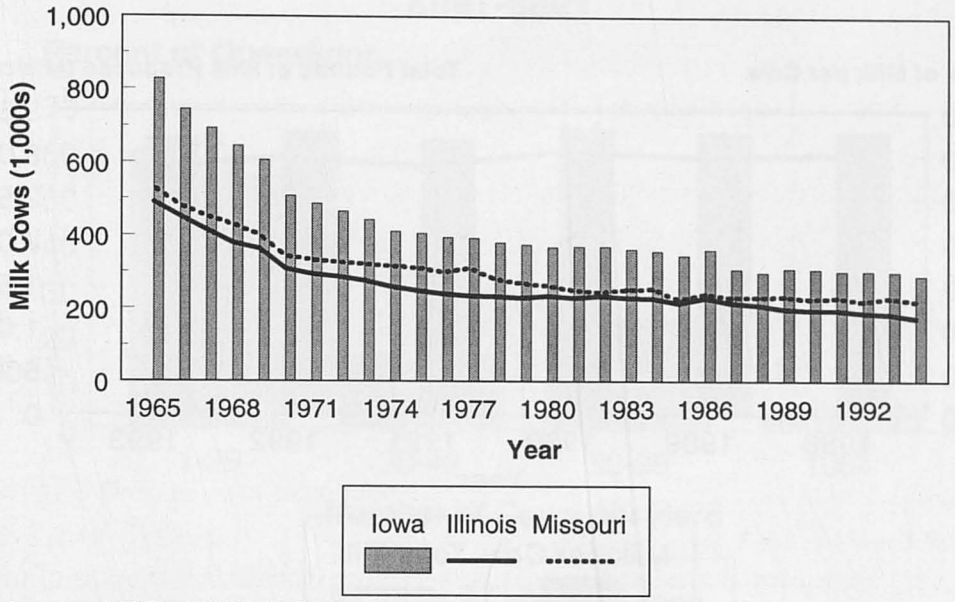
The average dairy cow in Missouri produced 13,807 pounds of milk in 1994 (Figure 53), which does not compare favorably with production in Wisconsin (15,001 pounds) and Texas (15,485 pounds). However, some dairy herds in Missouri average more than 20,000 pounds of milk per cow per year.

Over half the dairy operations in Missouri milk fewer than 30 cows (Figure 54). There has been a slight increase in the average number of head per operation since 1988 (Figure 55). However, the average size of a dairy farm in Missouri is still quite small. The typical commercial dairy farm in Missouri milks 70-80 cows. The slight increase in number of cows per operation in Missouri has occurred primarily as a result of decreases in the number of smallest herds, rather than because of an increase in the number of larger dairy farms.

Dairy farms are concentrated in the south-central and southwestern parts of the state (Figure 56). Three characteristics of the Missouri dairy industry indicate there may be substantial changes over the next decade. First, dairy farms in Missouri are small compared with typical dairy farms in other major milk-producing states, particularly in the southwestern United States. Comparative cost data indicate that dairy operations with more than 100 cows have considerable cost advantages relative to farms milking fewer than 30 cows. Second, the average age of the small dairy farmer and the age of the milking facilities on these farms are relatively high. Consequently, a significant proportion of Missouri dairy farmers are likely to retire over the next 10 years. Moreover, the small-scale, relatively old facilities on these farms are not likely to be purchased or continued in operation by a new producer when the existing producer retires. Third, the area where dairy farms in Missouri are most numerous is also the area of the state where nonagricultural demand for land is growing most rapidly. This high demand, coupled with the topography of south-central Missouri and growing environmental regulations, suggests that the Missouri dairy industry may exit south-central Missouri over the next decade. It remains to be seen if new dairy operations will be developed in other regions of the state.

Figure 50:

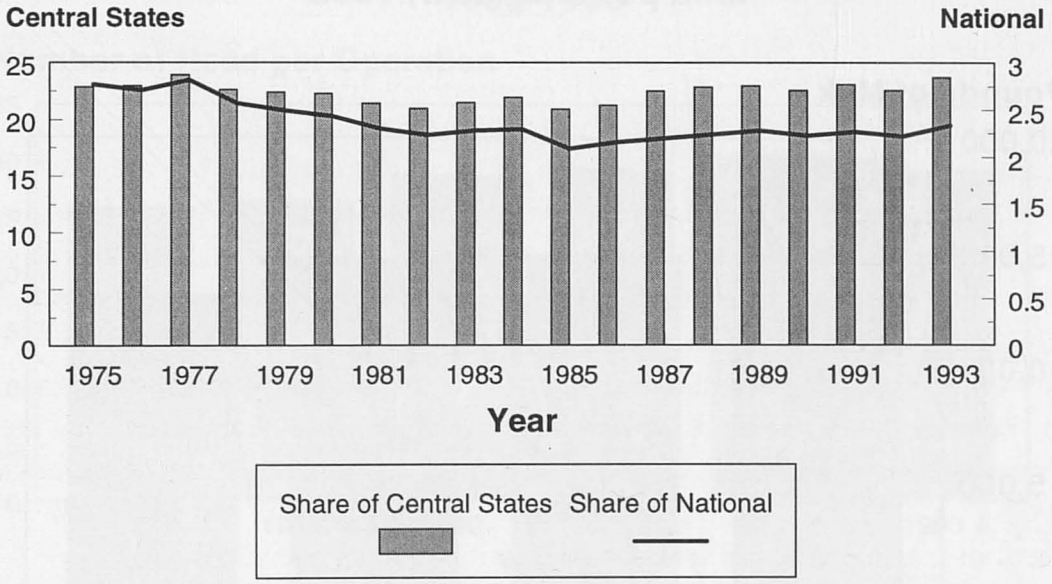
January 1 Milk Cow Inventories, 1965-1994



Source: USDA-NASS, MASS.

Figure 51:

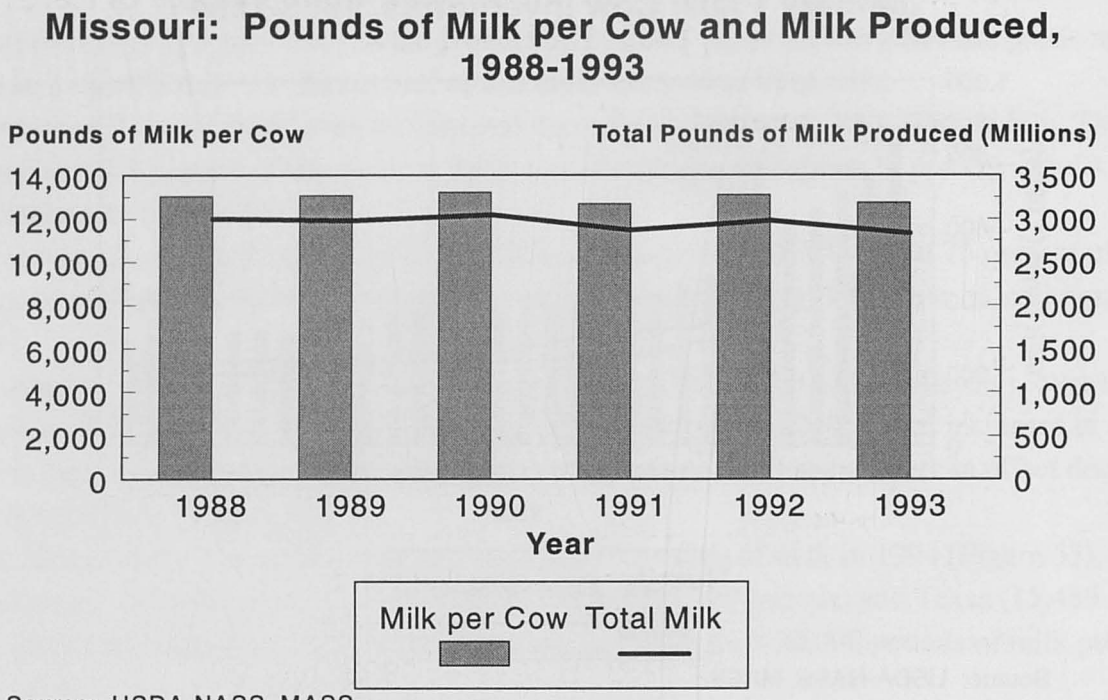
Missouri's Share of Milk Cow Inventories, 1975-1993 (percent)



Central States Include: AR, IL, IA, KS, MO, and NE.

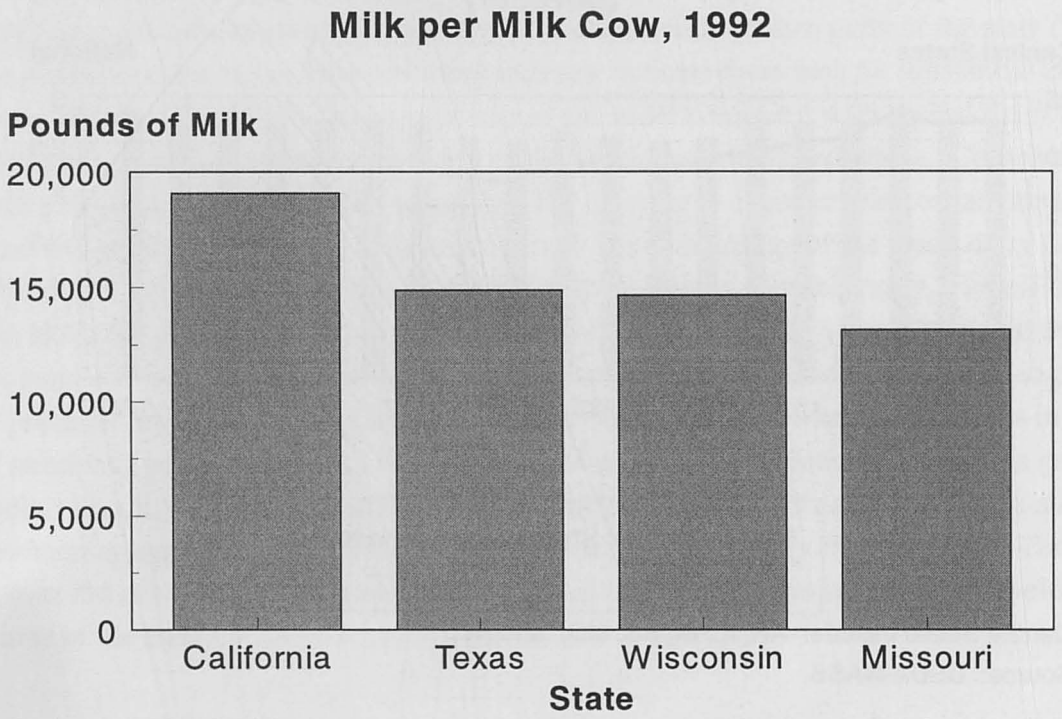
Source: USDA-NASS.

Figure 52:



Source: USDA-NASS, MASS.

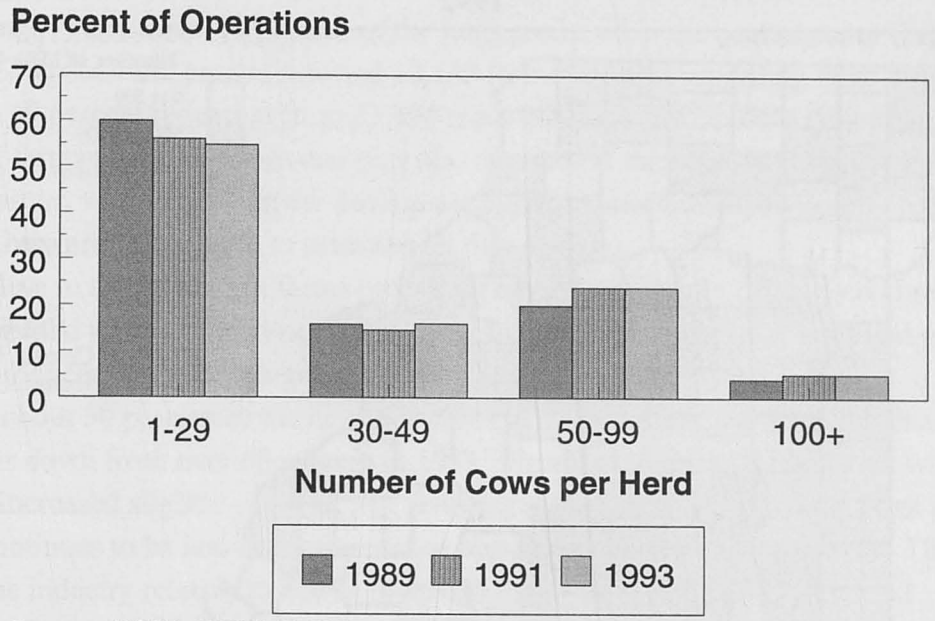
Figure 53:



Source: USDA-NASS.

Figure 54:

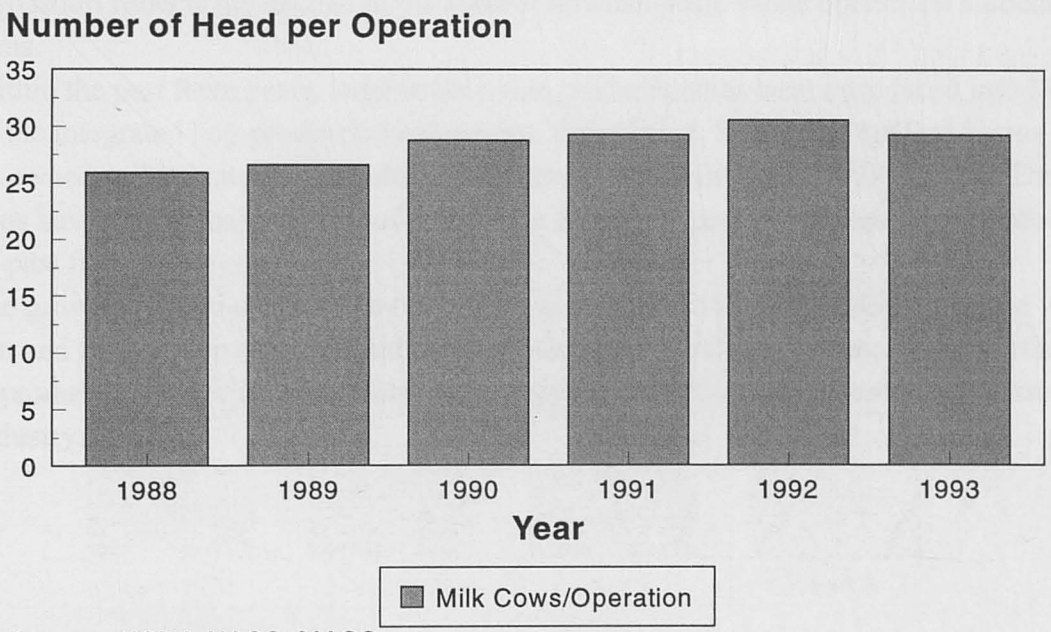
Missouri Dairy Farms: Percent of Operations by Size of Herd, 1989, 1991, and 1993



Source: USDA-NASS, MASS.

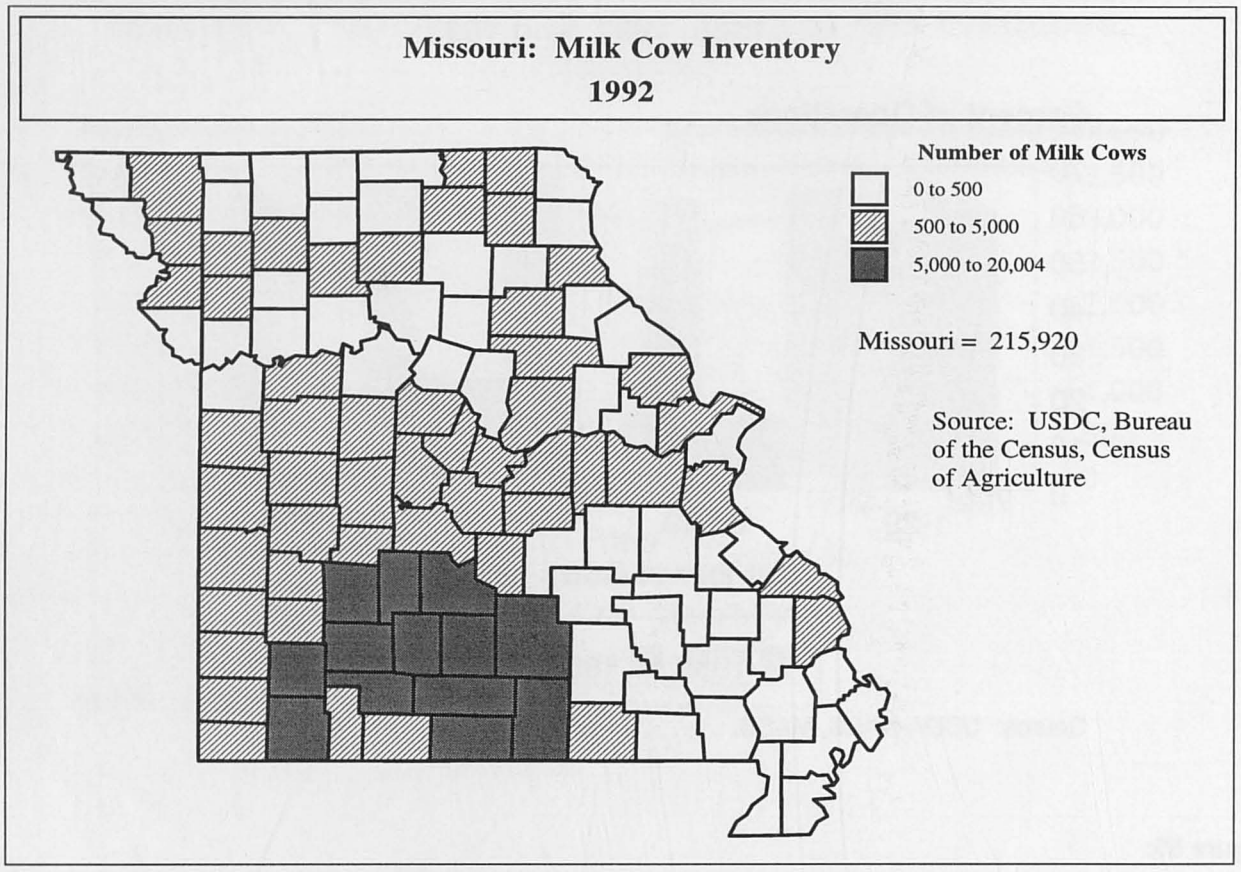
Figure 55:

Missouri: Average Number of Milk Cows per Operation, 1988-1993



Source: USDA-NASS, MASS.

Figure 56:


Missouri: Milk Cow Inventory
1992
Number of Milk Cows
0 to 500
500 to 5,000
5,000 to 20,004
Missouri = 215,920
Source: USDC, Bureau of the Census, Census of Agriculture

Swine Production

Missouri is a major swine-producing state consistently ranking among the top 10 states in the number of hogs produced (Table 10) Missouri accounts for about 7 percent of total U.S. hog production (Figure 57) and about 12 percent of the hogs produced in the central states (Figure 58).

The 1992 agricultural census reported 12,133 farms in Missouri selling hogs and pigs (Figure 59). This is a 49 percent reduction from 23,444 reported in the 1982 census (Figure 60). Although the number of farms producing hogs and pigs also declined at the national level over this period, the decline in Missouri was larger than the decline nationally. Consequently, Missouri moved from the fourth largest hog-producing state to seventhover this period.

The decline in the number of farms producing hogs was partially offset by an increase in the number of hogs and pigs marketed per farm. Therefore the total number of hogs and pigs marketed by Missouri producers did not change much over the past 10 years.

In 1993 about 50 percent of the hog operations in Missouri had less than 100 head (Figure 61). This number is down from over 60 percent in 1989. However, the number of farms with more than 100 head has increased slightly over the past five years. The average number of hogs per operation in Missouri continues to be less than other major hog-producing states (Figure 62). The size of the Missouri swine industry relative to that in Iowa and Illinois is illustrated in Figure 63.

The changing mix of hogs and pigs marketed in Missouri over the past decade reflects changes in swine production systems over this period. There has been a movement away from operations that specialize in either feeder pig production or feedlot finishing. Almost all the new hog production facilities that have been built in Missouri (and expansion of existing facilities) are farrow-to-finish operations.

The decline in the number of farms selling hogs and pigs in the southern part of the state reflects the decline in specialized production of feeder pigs. The decline in numbers in the northern part of Missouri reflects the decline in the number of small-scale swine operations associated with crop farms.

Within the past three years, large-scale swine production has been introduced into Missouri by some of the integrated hog-production companies. In addition, Premium Standard Farms developed a totally owned and operated hog production and slaughter facility with 80,000 sows. These new operations have been a major source of the growth that has occurred in Missouri pork production over the past five years.

The growth of large-scale swine operations and the associated production of swine waste for irrigation and fertilization of grass (and perhaps other crops) adds to the capacity of northern Missouri to produce high-quality forage and hence support the further expansion of the Missouri beef cattle industry.

Table 10:

Top Ten December 1 Inventories of Hogs
(1,000 hogs)

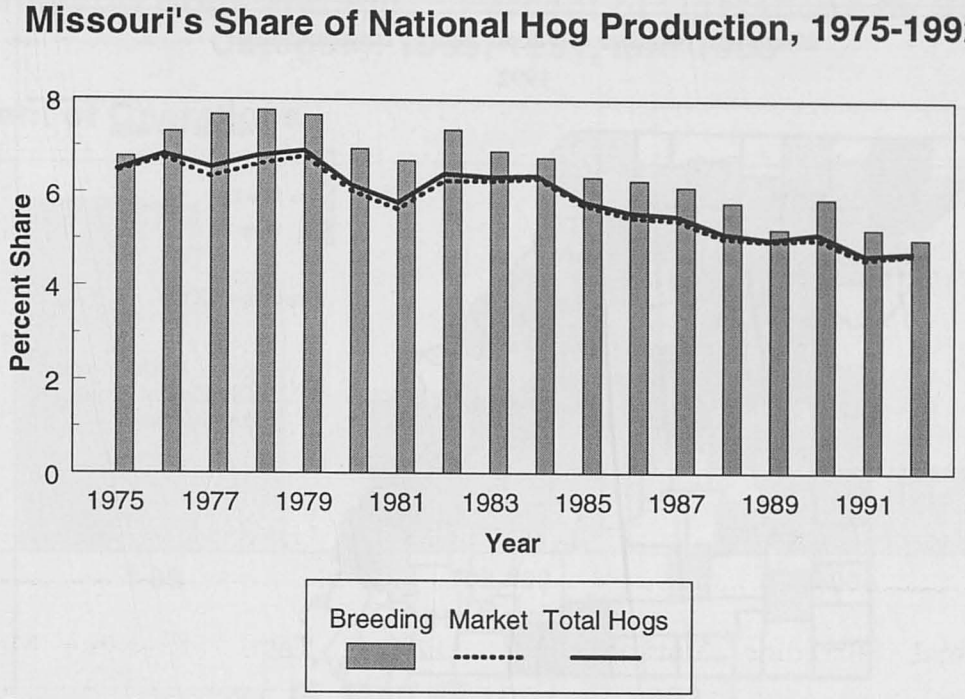
1993	Total	Breeding	Market	1990	Total	Breeding	Market
IA	15,800	1,900	13,900	IA	13,800	1,600	12,200
IL	5,900	720	5,180	IL	5,700	710	4,990
MN	4,700	580	4,120	MN	4,500	560	3,940
NE	4,600	580	4,020	IN	4,400	540	3,860
IN	4,550	550	4,000	NE	4,300	530	3,770
NC	4,500	500	4,000	NC	2,800	330	2,470
MO	2,800	370	2,430	MO	2,800	405	2,395
SD	1,830	235	1,595	OH	2,000	252	1,748
OH	1,750	220	1,530	SD	1,770	245	1,525
KS	1,440	160	1,280	KS	1,500	170	1,330

1985	Total	Breeding	Market	1980	Total	Breeding	Market
IA	13,500	1,650	11,850	IA	16,100	2,095	14,005
IL	5,400	685	4,715	IL	6,600	891	5,709
IN	4,150	560	3,590	MN	5,100	816	4,284
MN	4,100	525	3,575	IN	4,600	625	3,975
NE	3,900	470	3,430	MO	3,980	633	3,347
MO	3,050	430	2,620	NE	3,900	545	3,355
NC	2,350	310	2,040	NC	2,460	340	2,120
OH	1,980	275	1,705	GA	2,250	350	1,900
SD	1,610	206	1,404	OH	2,150	265	1,885
KS	1,520	188	1,332	KS	1,900	250	1,650

1975	Total	Breeding	Market
IA	12,600	1,827	10,773
IL	5,600	823	4,777
IN	3,900	573	3,327
MO	3,200	512	2,688
MN	3,000	465	2,535
NE	2,700	405	2,295
NC	1,900	304	1,596
OH	1,675	260	1,415
KS	1,650	231	1,419
SD	1,400	245	1,155

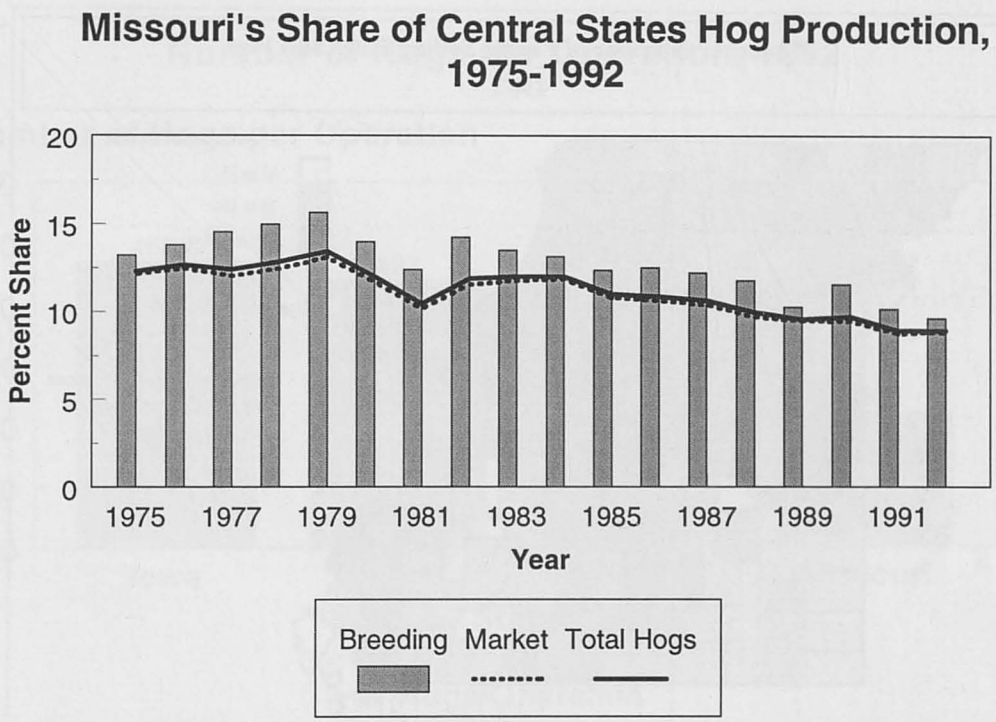
Source: USDA-NASS, MASS.

Figure 57:



Source: USDA-NASS.

Figure 58:



Central states: AR, IL, IA, KS, MO, and NE.

Source: USDA-NASS.

Figure 59:

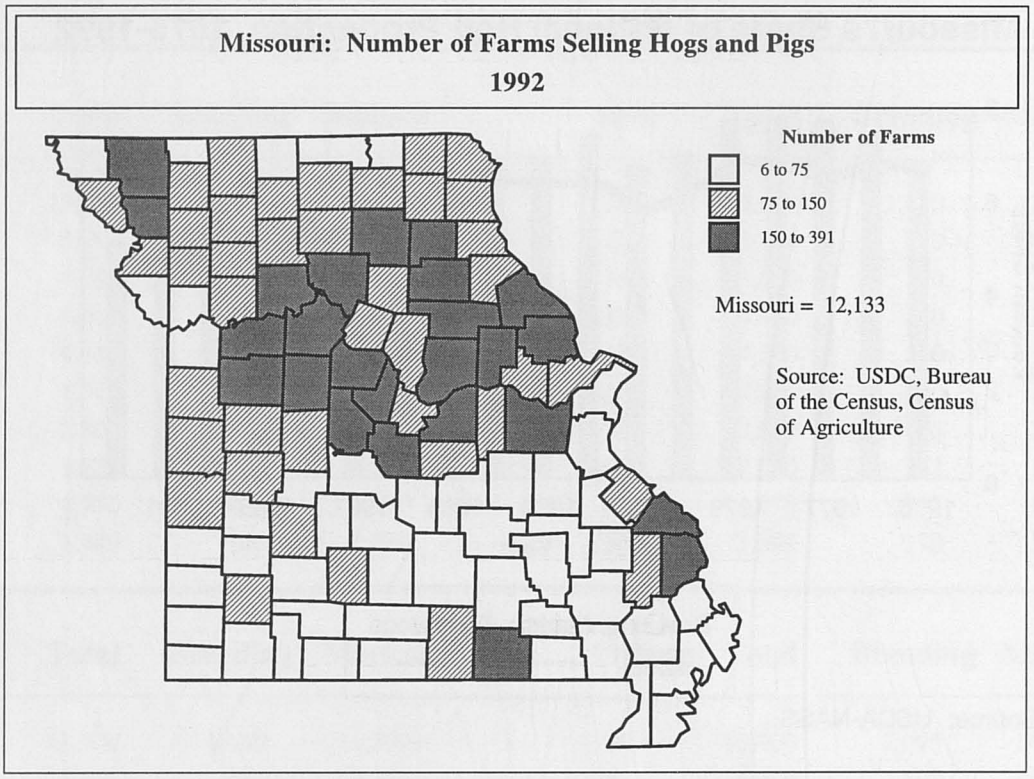


Figure 60:

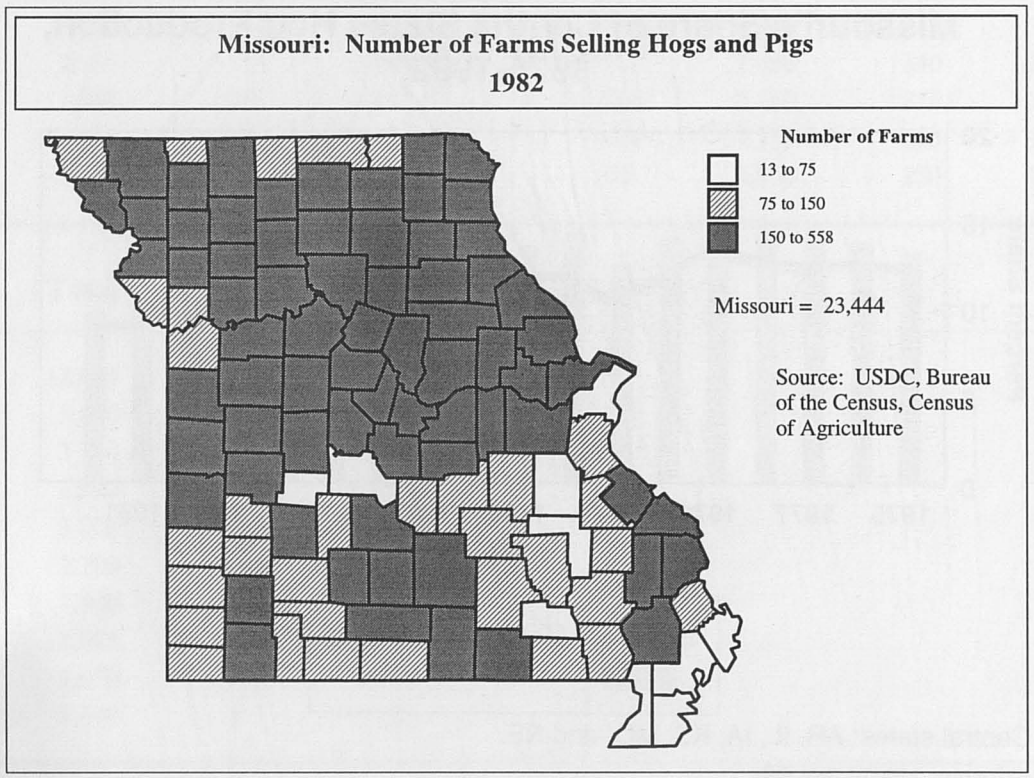
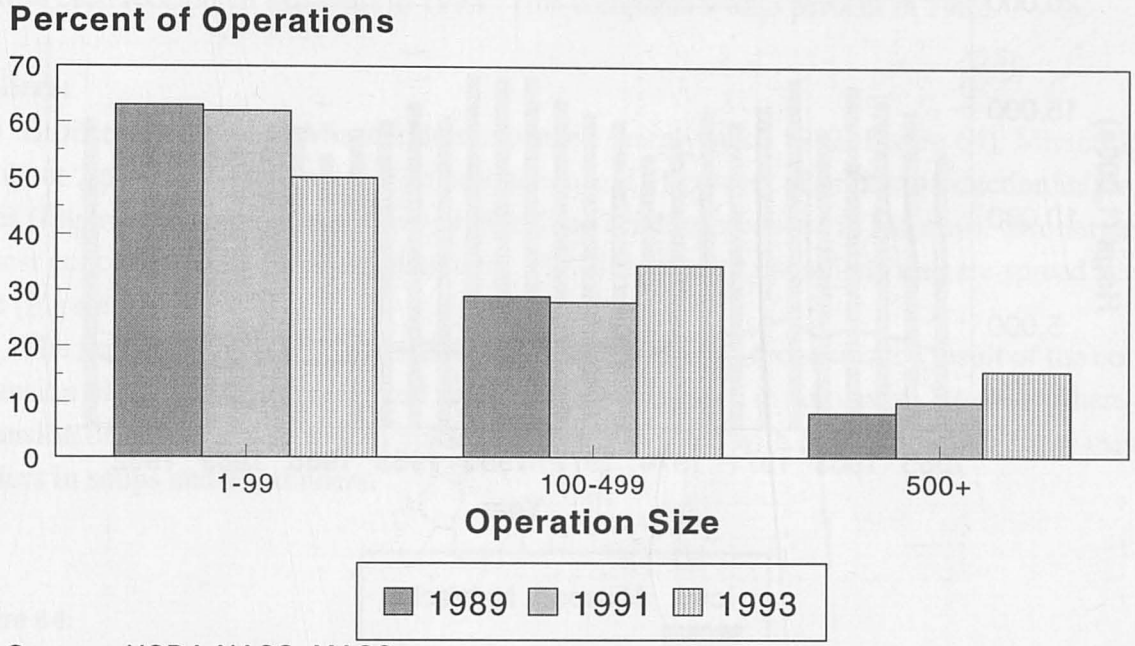


Figure 61:

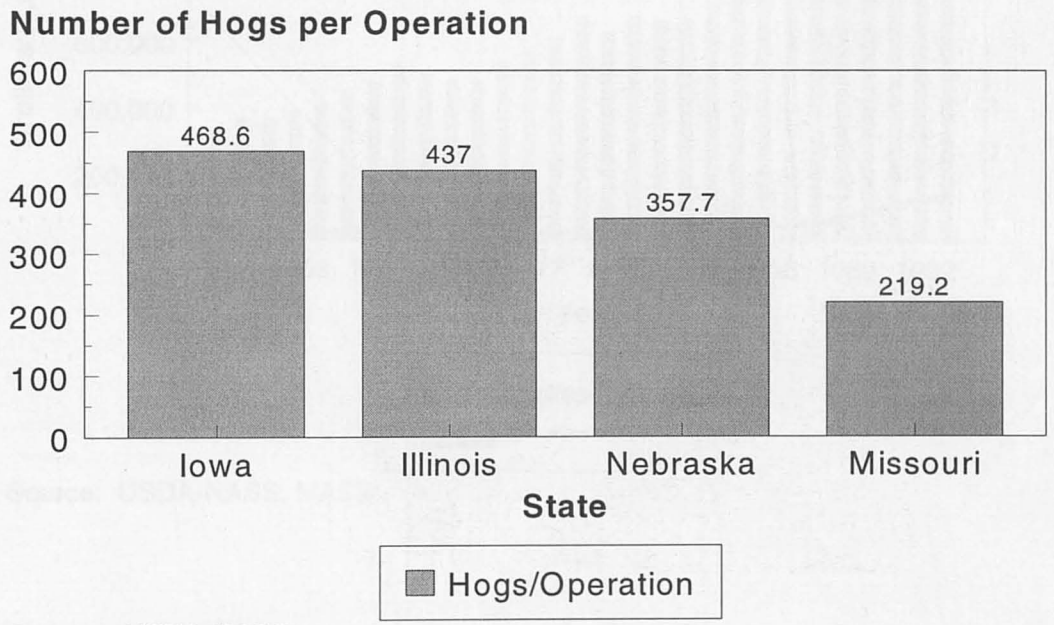
Missouri Hogs and Pigs: Percent of Operations by Size Category, 1989, 1991, and 1993



Source: USDA-NASS, MASS.

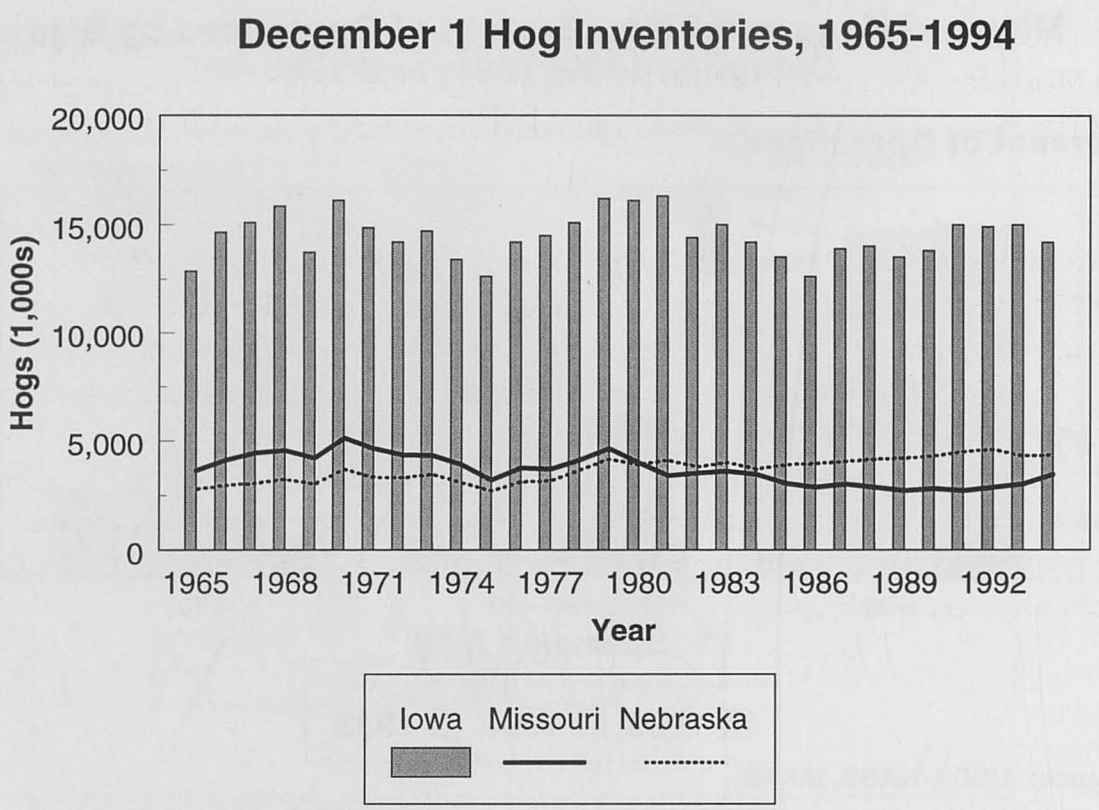
Figure 62:

Number of Hogs per Operation, 1992



Source: USDA-NASS.

Figure 63:



Source: USDA-NASS, MASS

Poultry Industry

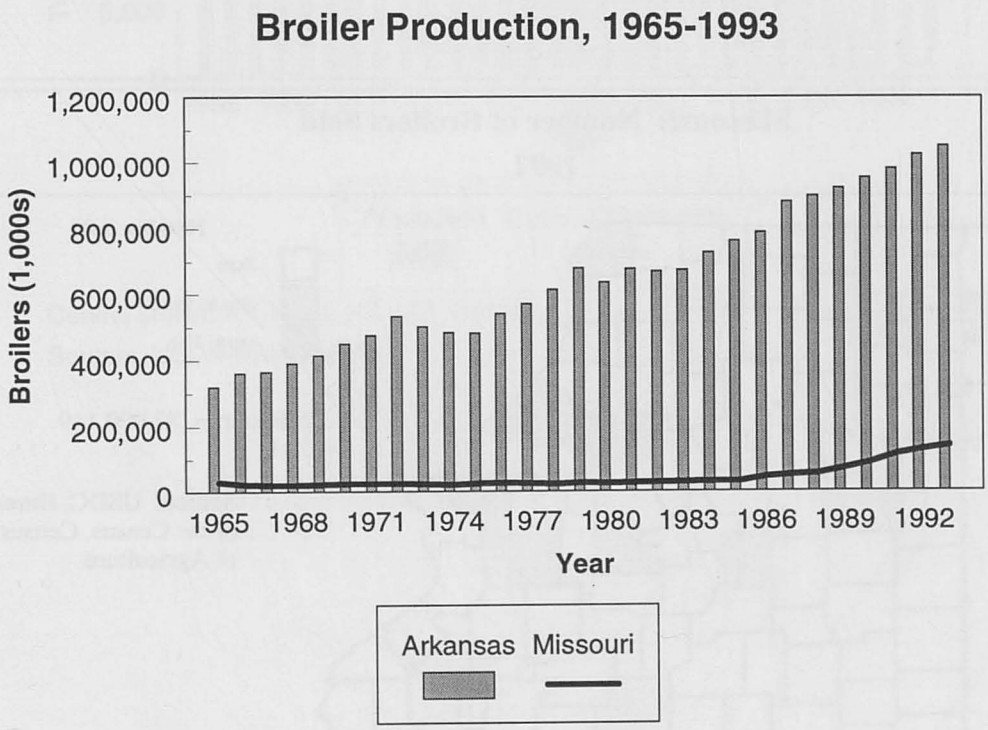
Expansion of broiler and turkey production has been a major source of growth in agricultural sales in Missouri over the past 10 years. Poultry and eggs accounted for 10.6 percent of total agricultural cash receipts in Missouri in 1992. This compares with 5 percent in 1982.

Broilers:

Broiler production in Missouri has expanded sharply since 1982 (Figure 64). Missouri accounts for about 2 percent of national broiler production and 11 percent of broiler production in the central states (Figure 65). In 1993 there were 138 million broilers produced in Missouri. Broiler production is most concentrated in southwest Missouri. However, broiler operations also are spread across the state (Figure 66).

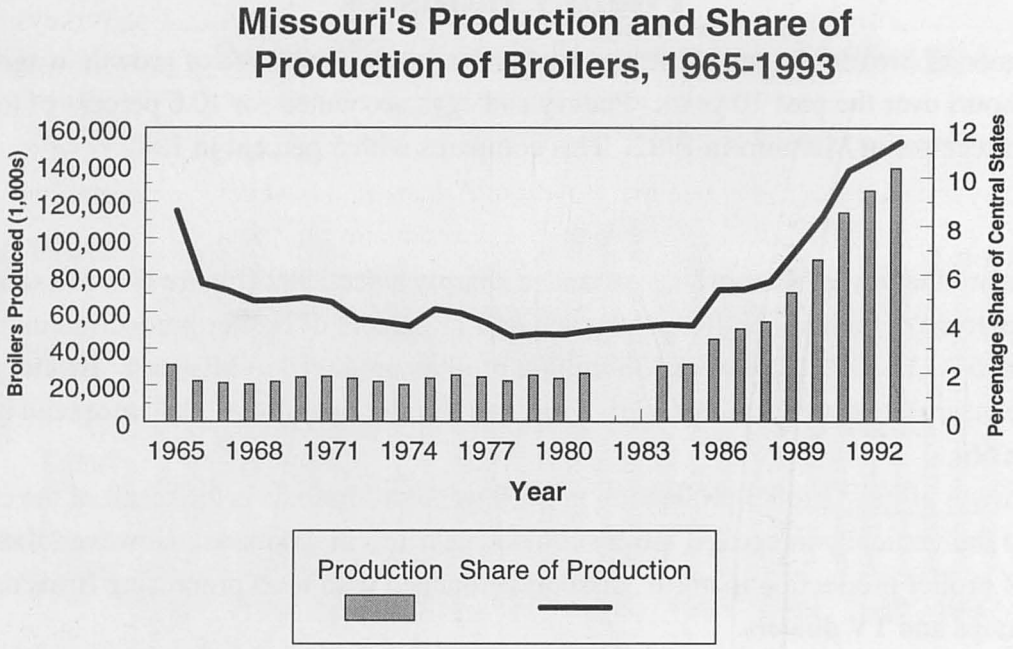
The growth of most broiler production in southwestern Missouri is the result of the continued expansion of the vertically integrated broiler companies based in Arkansas. However, there has been expansion of broiler production in north Missouri associated with food processing firms using broilers in soups and TV dinners.

Figure 64:



Source: USDA-NASS, MASS.

Figure 65:

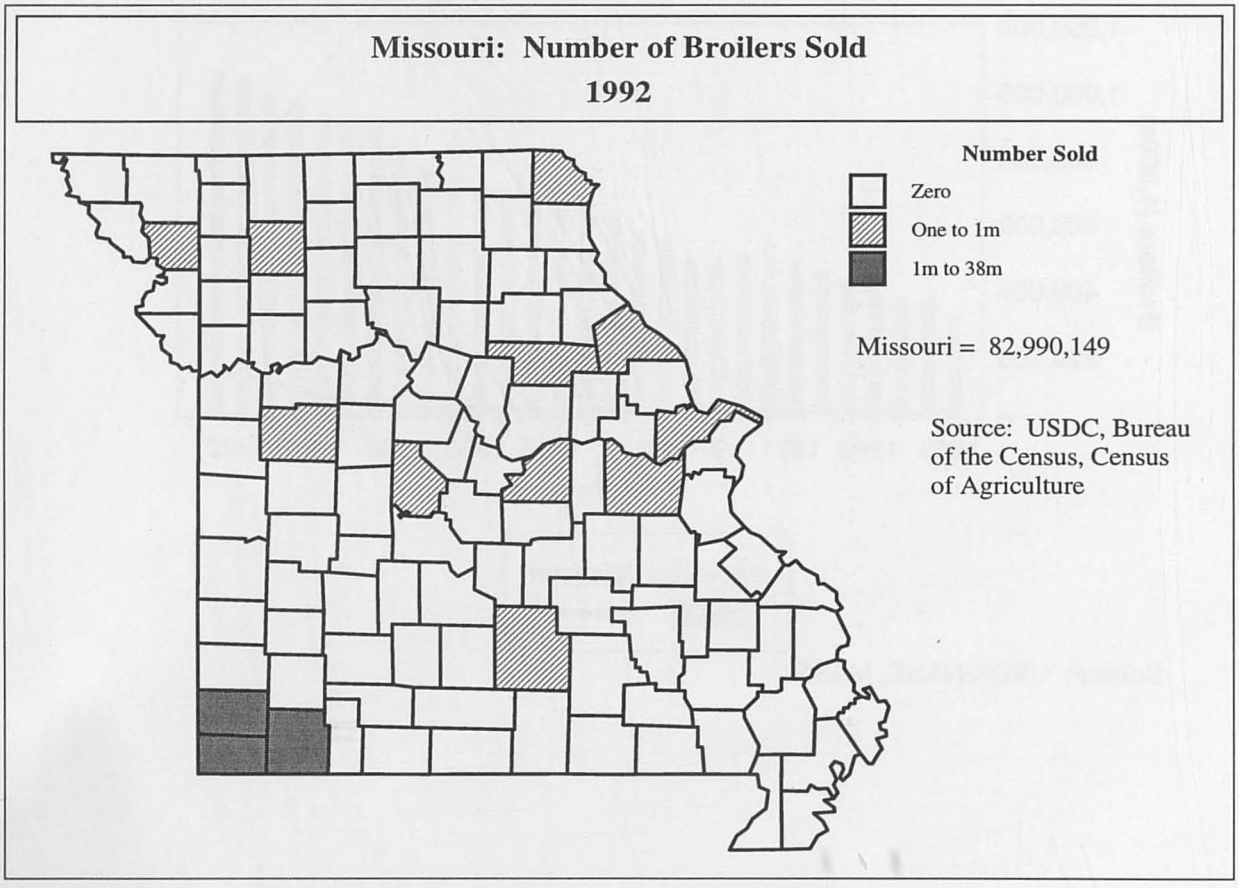


Central states: AR, IL, IA, KA, MO, and NE.

No data for 1982-1983.

Source: USDA-NASS, MASS

Figure 66:



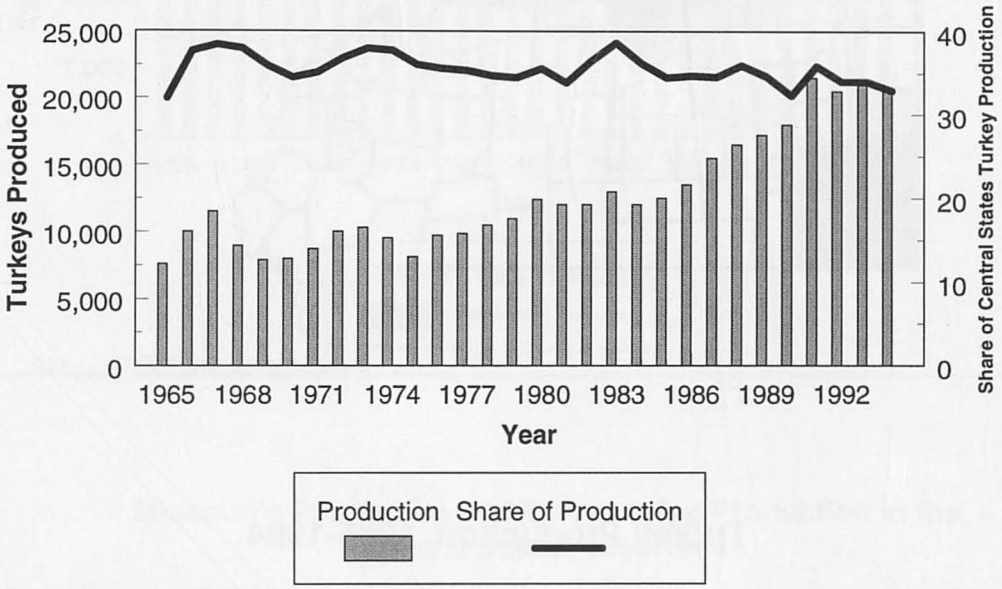
Turkeys:

Missouri is a major turkey-producing state. Missouri produced 20.5 million turkeys in 1994, which accounted for almost a third of the turkeys produced in the central states and 7 percent of total U.S. turkey production (Figure 67). Turkeys are produced in 19 counties in Missouri (Figure 68).

Turkey production in Missouri has almost tripled since 1975 (Figure 69). Growth of the Missouri turkey industry has paralleled the growth in Arkansas. However, turkey production in Missouri has increased substantially faster than turkey production in Iowa.

Figure 67:

Missouri's Production and Share of Production of Turkeys in the Central States, 1965-1994



Central states: AR, IL, IA, KS, MO, and NE.

Source: USDA-NASS, MASS.

Figure 68:

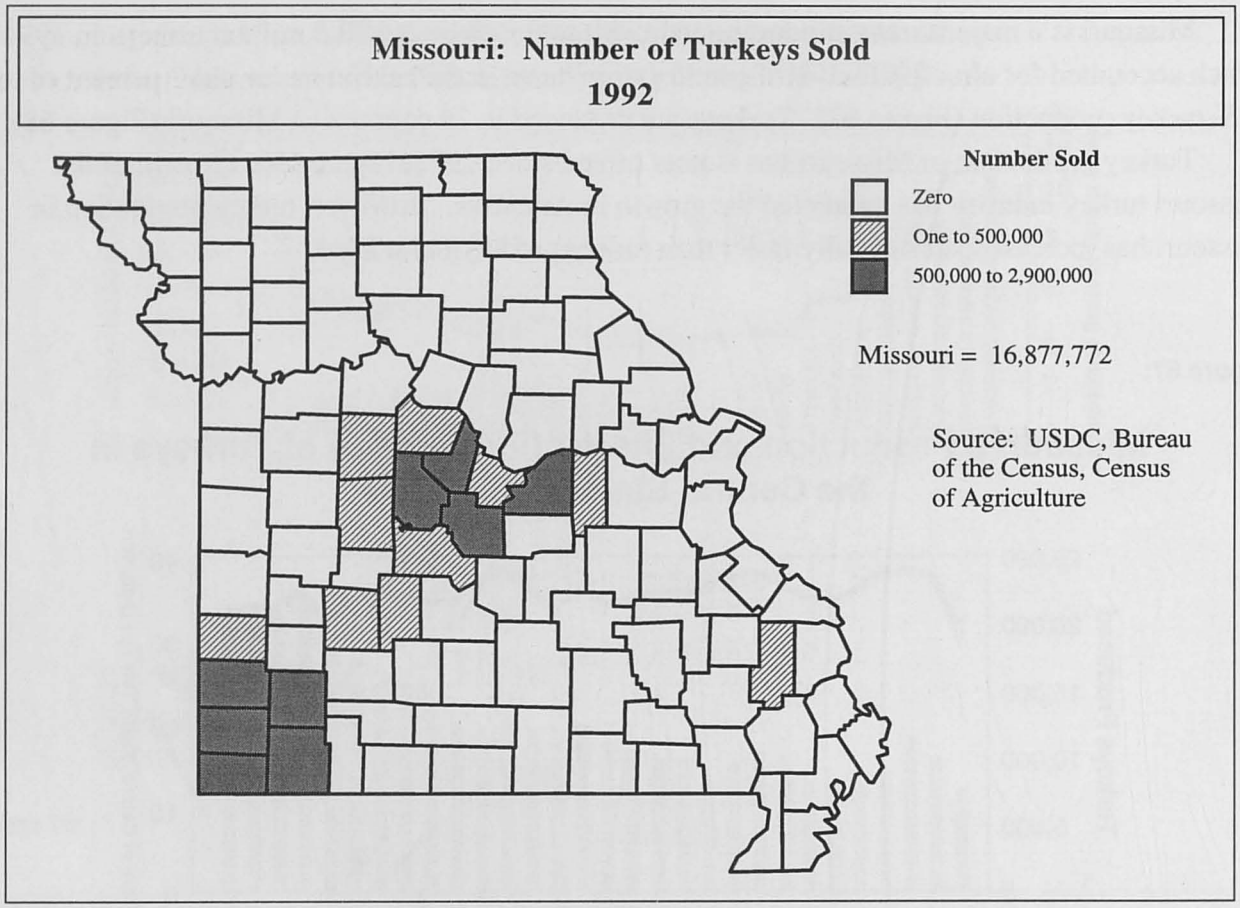
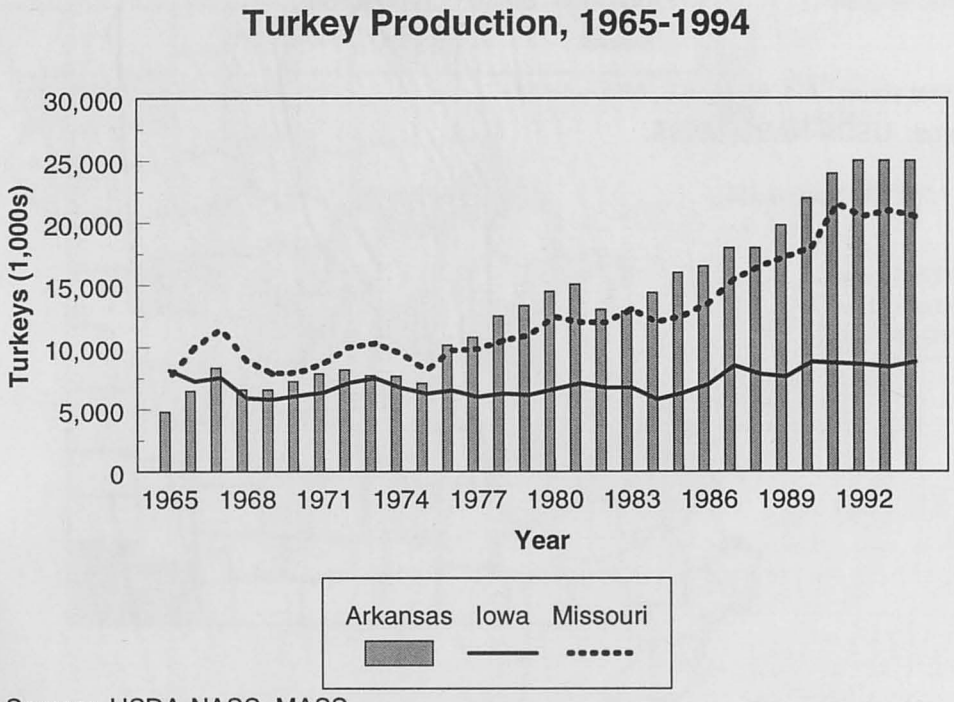


Figure 69:

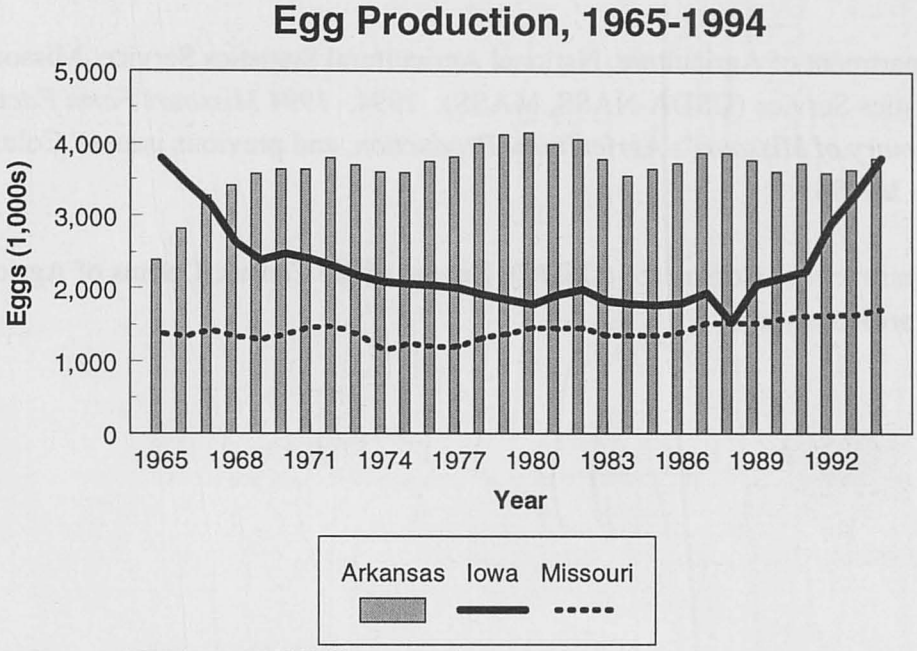


Source: USDA-NASS, MASS.

Eggs:

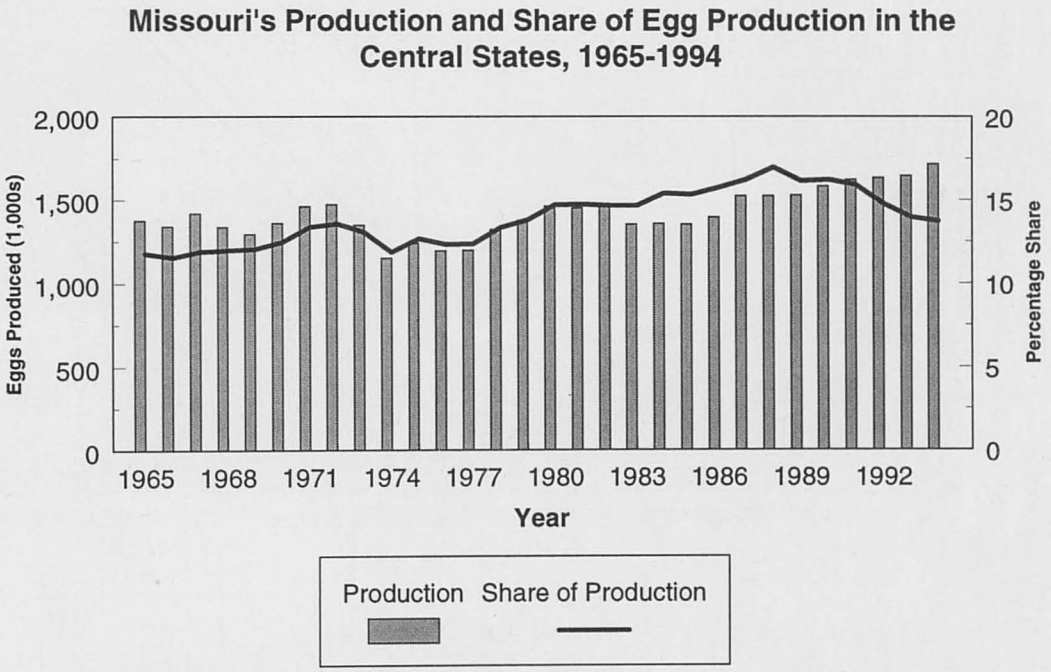
Production of eggs in Missouri has trended upward slightly over the past 25 years (Figure 70). Missouri produces about 2 percent of the nation's egg supplies and accounts for about 14 percent of the eggs produced in the central states (Figure 71).

Figure 70:



Source: USDA-NASS, MASS.

Figure 71:



Central states: AR, IL, IA, KS, MO, and NE.

Source: USDA-NASS, MASS.

Data Sources

United States Department of Agriculture, National Agricultural Statistics Service (USDA-NASS). 1993. *Agricultural Statistics, 1993* and previous issues. Washington, D.C.: United States Government Printing Office

United States Department of Agriculture, National Agricultural Statistics Service, Missouri Agricultural Statistics Service (USDA-NASS, MASS). 1994. *1994 Missouri Farm Facts: A Complete Summary of Missouri's Agricultural Production*, and previous issues. Columbia, Missouri: MASS.

United States Department of Commerce (USDC), Bureau of the Census, Census of Agriculture, 1992 and previous years.

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