A large, stylized outline of the state of Oklahoma, rendered in multiple parallel black lines. The outline is positioned on the left side of the cover, with the title text placed within its white interior.

**Structural
Changes in Oklahoma Agriculture**

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CONTENTS

Farm and Nonfarm Income Changes in Oklahoma	6
Changes in Sources of Income and Employment in Oklahoma	7
Changes in Sources of Farm Income in Oklahoma	10
Changes in the Distribution of Farm Receipts Per Farm	12
Changes in Prices Received and Paid by Oklahoma Farmers	12
Changes in Farm Resource Use and Efficiency	15
Changes in Farm Numbers and Size	15
Farm Labor	16
Farm Land and Buildings	18
Farm Machinery	21
Fertilizer Use and Irrigated Acreage	22
Production Expenses	23
Productivity	26
Legal Organization of Farms	29
Changes in Crop Acreages and Livestock Numbers	30
Changes in Oklahoma and Regional Shares of U.S. Farm Production ...	33
Cattle and Calves	33
Wheat	35
Dairy Products	36
Cotton	36
Poultry and Eggs	37
Hogs	38
Summary	38

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Structural Changes In Oklahoma Agriculture

Daryll E. Ray and Glenn S. Collins*

Agriculture in Oklahoma is continually adjusting to changes in the productivities and prices of inputs and to changes in demand for its products. Changes in productive techniques, relative input prices and government program provisions alter the demand for agriculture inputs, the resource mix and the optimum farm size in Oklahoma agriculture. Demand for Oklahoma's agricultural output changes with consumer preferences, income growth and export markets.

Oklahoma farmers have made substantial adjustments in response to these economic forces. Adjustments have included large scale substitution of capital for labor, farm enlargement with the attendant decline in farm numbers and operators, and greater emphasis on livestock production relative to crop production.

Since many of the forces responsible for these changes will be continuing in the future, it is instructive to analytically review economic trends in Oklahoma agriculture. The purpose of this bulletin is to present and analyze these long-term trends for use as a backdrop in later investigations of adjustments likely to occur in the future. No attempt is made to forecast trends in the current study. The bulletin also is designed as a reference for agricultural and other leaders on the basic developments in Oklahoma agriculture and on how these developments relate to general economic progress in the state.

Charts and graphs are used liberally to depict trends in key variables. Whenever possible, variable levels are scaled, through the use of semi-log plotting, so that both percentage changes and absolute changes can be observed. By using this technique, equal slopes indicate equal percentage rates of change and equal vertical distances represent equal total percentage changes. For example, the lines connecting plots of U.S. per capita income for 1947 to 1948 and of Oklahoma per capita income for

Research reported herein was conducted under Oklahoma Station Project No. 1531.

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1952 and 1953 in Figure 1 have the same slope which denotes an identical rate of growth (7 percent).

A set of tables containing the data used to construct the graphs and charts may be obtained by request from the Department of Agricultural Economics, Oklahoma State University, Stillwater, Okla, 74074.

Farm and Nonfarm Income Changes In Oklahoma

Trends in personal income per capita (including all farm and non-farm persons) for the United States and Oklahoma are shown in Figure 1. Depending on the criterion used, comparisons of U.S. and Oklahoma income trends can result in conflicting conclusions. Absolute measures, such as arithmetic differences in national and state per capita income

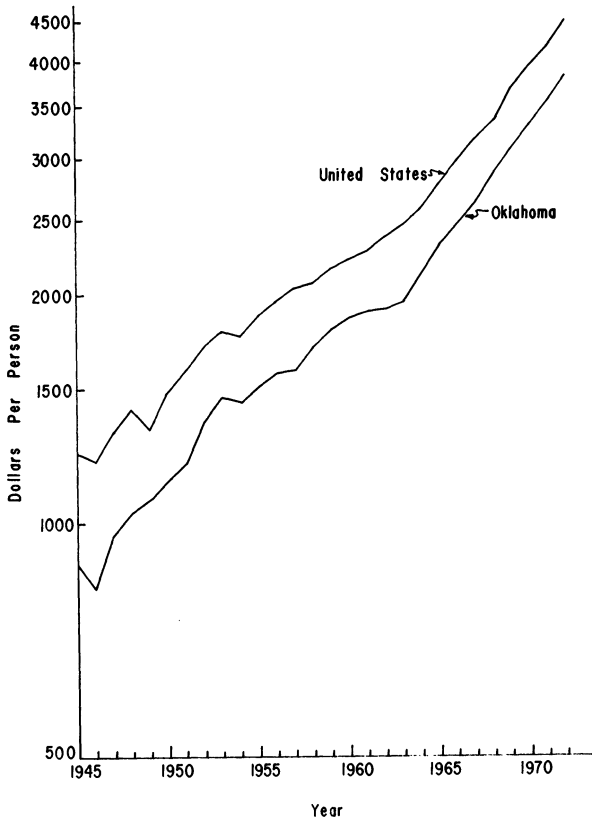


Figure 1. Trends in Per Capita Personal Income, United States and Oklahoma, 1945-1972

levels, suggest a worsening in Oklahoma's income position through time. On the other hand, gains in Oklahoma's income position are revealed by percentage change comparisons.

During the 1945-72 period Oklahoma per capita incomes increased 325 percent while nationally the increase was 262 percent. These changes represent an annual compound rate of growth over the period of 5.5 percent for Oklahoma and only 4.9 percent for the U.S. However, the arithmetic difference between national and Oklahoma per capita incomes has widened from \$340 in 1945 to \$678 in 1972. As indicated by the slopes of the semi-log plots in Figure 1, Oklahoma's rate of income growth was slightly higher than the national rate during the 1965-72 period — a time span when the absolute income differences increased from \$451 to \$678. Had Oklahoma's per capita incomes increased at the lower national rate during 1965-72, the 1972 Oklahoma figure would have been \$53 lower. A 1965-72 growth rate of 9.9 percent would have been required to bring the 1972 Oklahoma per capita income up to the national average. The actual growth rates for the period were 7.3 percent for Oklahoma and 7.1 nationally.

Changes in Sources of Income and Employment in Oklahoma

As per capita incomes increase consumers change their expenditure patterns. A five percent increase in real per capita income does not result in a five percent increase in consumption of each good and service used by the consumer. Expenditures for some items may increase very little while purchases of other goods and services may increase by more than five percent. Output growth of the various sectors of the economy are influenced by these changes in demand patterns along with changes in productivity and other factors. The sectors with high growth rates become increasingly important as sources of employment and income.

Farming as a source of income in Oklahoma decreased in relative importance between 1940 and 1970 (Figure 2). In 1940, 22 percent of all Oklahoma income was generated from farming operations. The farm share of Oklahoma income declined to 5.6 percent by 1970, then showed a slight increase to 6.1 percent in 1972. In 1940 nearly 1 out of every 2 workers employed in Oklahoma were engaged in farming activities. By 1972, 13.5 percent, or slightly over 1 out of every 10 workers, were farm employed. The lower farm share of Oklahoma income relative to farm share of employment reflects lower average incomes for farmers compared with other Oklahoma workers. As data for 1973 and 1974 become available, farming's importance as a source of income will be somewhat improved due to higher wheat prices during these years and favorable cattle price for part of the period.

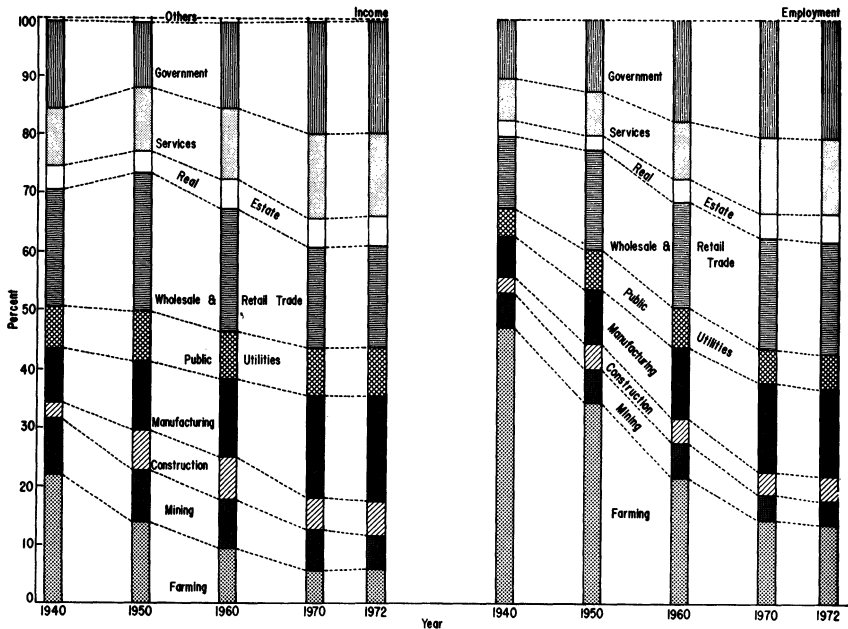


Figure 2. Trends in Sources of Income and Employment in Oklahoma, Selected Years, 1940-1972

Mining (including oil) has also declined as a source of income since 1940 and between 1960 and 1972 lost ground as a source of employment. Later data will show a reversal of these downward trends in mining's share of income and employment. The government, manufacturing and services have increased in relative importance as sources of income and employment. During 1950 to 1972, income from government employment increased from 11.6 percent of all Oklahoma income to 19.3 percent in 1972. Employment in government accounted for 12.7 of all Oklahoma workers in 1950 and increased to 20.6 in 1972. Manufacturing's shares of income and employment were 9.3 percent and 7.2 percent in 1940 and 18.2 and 14.9 percent respectively in 1972. The share of total Oklahoma income from services from 1950 to 1972 increased from 11.0 percent to 14.0. In the same period, the percent of all Oklahoma workers employed by service firms increased from 7.5 to 13.2 percent.

Figures 3 and 4 show trends of gross and net farm income per farm for the U.S. and Oklahoma. The semi-log plot indicates that Oklahoma gross income per farm, while considerably below the national average, has grown at about the same rate as U.S. figure during the 1960-1973

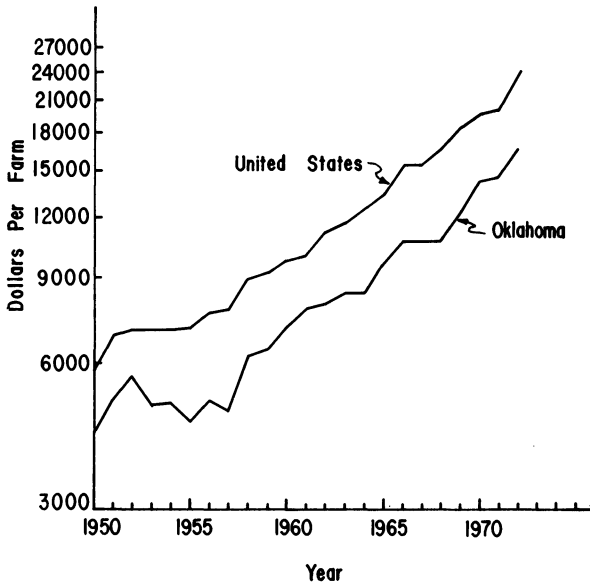


Figure 3. Trends in Gross Income Per Farm, United States and Oklahoma, 1950-1972

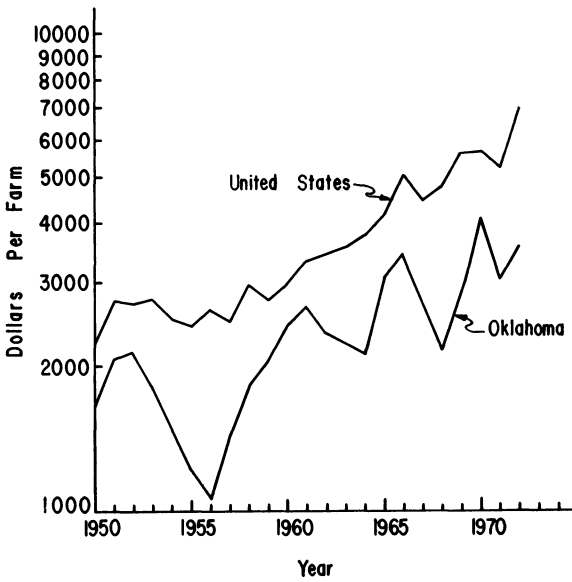


Figure 4. Trends in Net Income Per Farm, United States and Oklahoma, 1950-1972

period (Figure 3). Net farm income per farm for Oklahoma shows a more erratic pattern than for the U.S. (Figure 4). Since prices of intermediate products such as feed grains and stocker cattle tend to rise and fall with final products such as fed hogs and cattle, input expenditures of farmers producing final products often decline (rise) with lower (higher) prices for their output. This causes the difference between gross income and production expenses (not income) to vary less for the entire U.S. than for an individual state in which a significant portion of the agricultural output is used as inputs by farmers in other states. During the 1970-1973 period, Oklahoma net income per farm averaged 60.4 percent of net income per farm in the U.S.

Changes in Sources of Farm Income in Oklahoma

Farm income data used in this publication include only income generated from farming activities. Many farmers receive additional income from off-farm employment. In 1969, over 60 percent of farm operators in the state reported some off-farm employment during the year. Each year during the last two decades, well over one-half of Oklahoma's farm operators have supplemented their farm incomes with employment in industry, government and other non-farm sectors. The farm income data presented here do not include earnings from their non-farm employments.

The make-up of Oklahoma's agricultural sales has changed markedly over the last 30 years. Livestock and livestock products have increased in relative importance as a source of revenue while the proportion of farm revenue from crop sales has declined. During the 1946-1950 period sales of livestock and livestock products accounted for 51.9 percent of total farm income and crops comprised 46.6 percent (Figure 5). By 1972, the livestock percentage has increased to 72.1 percent and the crop figure declined to 19.9 percent. Meanwhile, government payments increased from 1.5 percent of farm receipts during 1946-1950 to 11.2 percent during the 1966-1970 period and declined to 8.0 percent in 1972.

The increase in livestock and livestock products as a source of farm income was due solely to the mammoth increases in the sales of cattle and calves. In the 1946-1950 period, cattle and calves represented 28.2 percent of all cash receipts. By 1972, the percentage has leaped to 62.0 percent. The relative importance of other livestock and livestock product sales diminished over the time span. Cash receipts from dairy and dairy products declined from 9.4 to 4.9 percent of the total. Poultry and egg sales dropped from 7.3 percent of total cash receipts to 2.0 percent while for hogs the decline was from 6.4 percent in 1946-1950 to 2.7 percent in 1972.

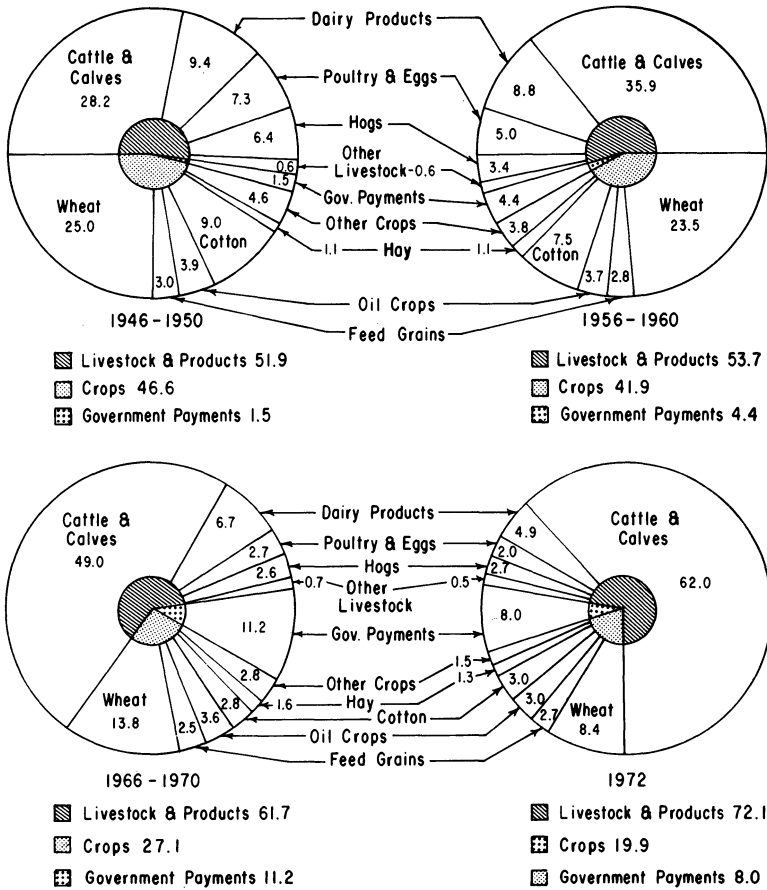


Figure 5. Trends in Source of Cash Receipts from Sale of Crops, Livestock and Products, Oklahoma, 1946-1972

Most of the decline in cotton's relative importance as a source of farm income occurred prior to the 1946-1950 period, but between the 1946-1950 period and 1972 cotton's percent of total income declined from 9.0 percent to 3.0 percent. The proportion of farm income from wheat declined from 25.0 percent in 1946-1950 to 8.4 percent in 1972. The percentage of farm income from feed grains, oil crops and hay have remained relatively stable over the last 3 decades.

Changes in the Distribution of Farm Receipts Per Farm

The distribution of Oklahoma farms by economic classes for the years 1949 and 1969 are shown in Figure 6. During the two decade period, many of Oklahoma's farms shifted into larger economic classes. Farms with annual sales of \$40,000 and over increased from 1.2 percent in 1949 to 4.5 percent of all farms in 1969. The proportion of farms selling \$10,000 to \$39,999 increased from 17.7 percent of the total in 1949 to 21.1 percent in 1969, while farms with annual sales of \$2,500 to \$9,999 increased from 33.2 to 36.6 percent. Meanwhile, farms with annual sales between \$50 and \$2,499 declined from 13.1 percent to 6.9 percent.

Changes in Prices Received and Paid by Oklahoma Farmers

Figure 7, shows the trends in prices received and paid by farmers as a percent of 1967. In 1945 the index of prices received by Oklahoma

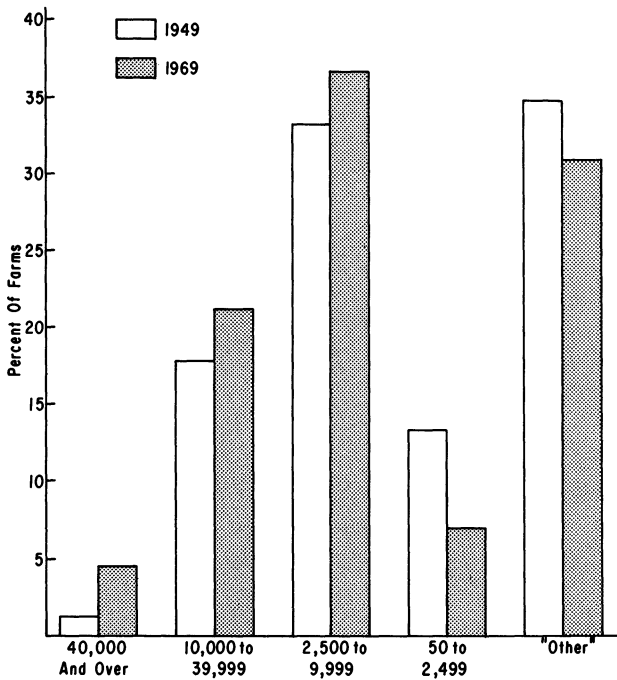


Figure 6. Percentage of Oklahoma Farms in Economic Classes, 1949 and 1969

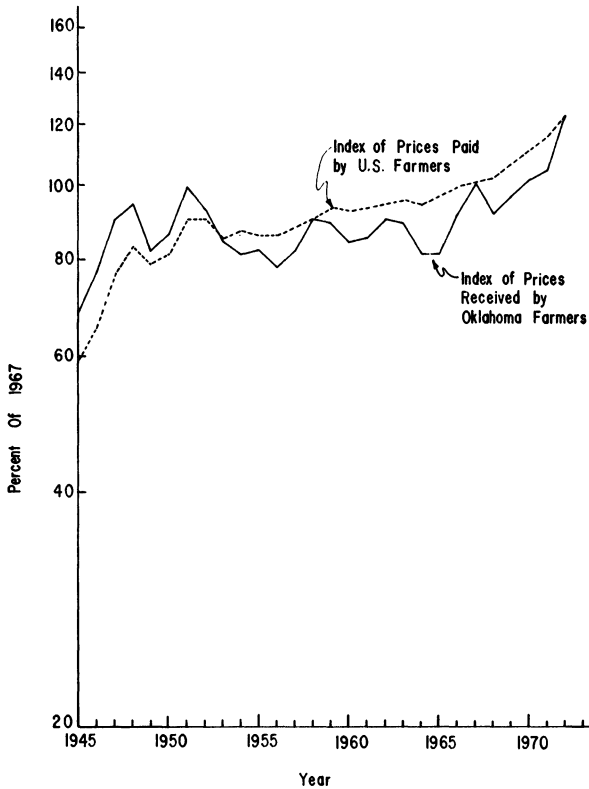


Figure 7. Index Numbers of Prices Received and Paid by United States and Oklahoma Farmers, 1945-1972, 1967=100

farmers for all farm products was two-thirds of the 1967 index value of 100. However, 1945 input prices were even lower — 59 percent of 1967. The Oklahoma prices received index continued to be above the index of prices paid by U.S. farmers¹ through 1952. In 1953, however, the prices received index fell below the prices paid index and remained lower for all but three years. As indicated by the slope of the broken-line on the semi-log graph in Figure 7, the rate of increase in the prices paid index was relatively constant between 1953 and 1968 but grew at an accelerated rate from 1969 to 1972. The index of prices received by Oklahoma farmers was somewhat erratic over the time span with a major upturn between 1956 and 1967 and again between 1969 and 1972.

¹An index of prices paid by Oklahoma farmers is unavailable. The U.S. index is likely to be a good proxy for an Oklahoma index of prices paid since input prices tend to be relatively stable across the nation.

Another measure of farmers' economic status, designed to show the purchasing power of farm products, is the parity ratio ($\text{Index of Prices Received} \times 100 \div \text{Index of Prices Paid}$). This ratio for all Oklahoma farm commodities is shown in Figure 8 for the 1945 to 1972 period. While the parity ratio indicates the purchasing power of a given quantity of agricultural output, it tends to give a biased view of the real economic position of farmers. For example, the parity ratio was 100.0 in 1958 and 92.0 in 1970, yet during this time net farm income per farm increased from \$1,893 to \$4,100. Increased productivity through higher yields, higher rates of livestock gain, economies of larger farm units and product specialization is not reflected in the parity ratio.

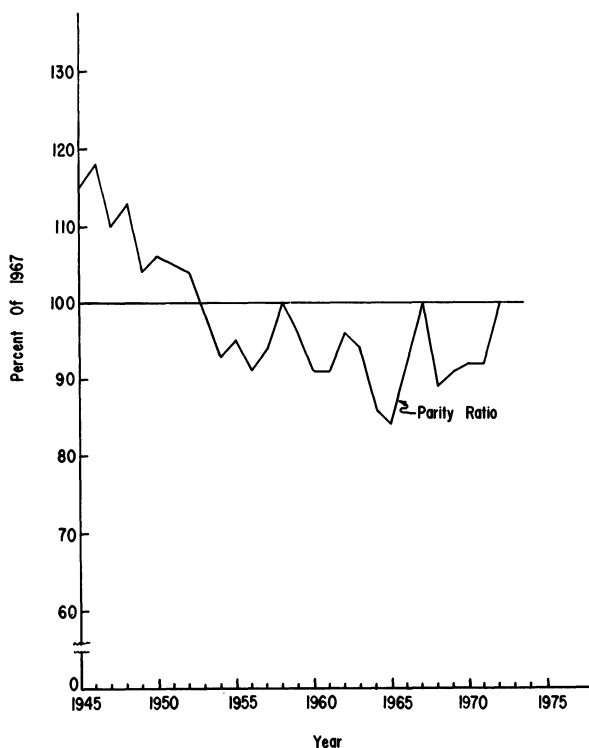


Figure 8. Ratio of Index of Prices Received by Oklahoma Farmers to Prices Paid, 1945-1972, 1967=100

Changes In Farm Resource Use and Efficiency

Oklahoma farmers have made dramatic adjustments in the quantity, quality, and organization of resources used to produce the state's agricultural products. Abundant and attractively priced capital inputs supplied by the non-farm sector have replaced substantial quantities of inputs supplied by the farm. Fertilizers, new seed varieties, pesticides, improved breeding herds, feed additives, and modern machinery have enabled fewer farmers to produce ever greater levels of agricultural output. Total input use has increased only moderately, however, due to reductions in labor requirements, an earlier phase out of farm produced animal power, and improved management and organization.

Changes in Farm Numbers and Size

Figure 9 illustrates the substantial decline in Oklahoma farm numbers and the accompanying increase in acreage per farm between 1930 and 1969. Again, each series has been plotted with semi-log axes so that line segments of equal slope represent equal percentage rates of change. The rate of decline in farm numbers increased slightly during the five year segments between 1945 and 1959, but a lower rate of decline is observed between 1959 and 1969. Over the entire 40 year period farm numbers declined from 204 thousand to 83 thousand while average acreage per farm increased from 165 acres to 434 acres.

As figure 10 shows, average farm size varies considerably among counties across the state. The average size of farms in the Panhandle Counties exceeded 950 acres in 1969 with Cimarron County having the largest farms (1810 acre average). Osage County farms average 1035 acres each. The smaller farms tend to be in the extreme Northeastern Oklahoma. Tulsa County had the smallest average farm size in 1969 at 183 acres. In 1964, Tulsa County's average farm size was 240 acres while the number of farms increased from 768 in 1964 to 1010 in 1969. The increased popularity of former city dwellers moving to "rural residences", that generate enough revenue to be counted as a farm, but contribute little to family income, probably accounts for most of this farm number increase.

The distribution of farm numbers by acreage size classifications is shown in Figure 11. The percentage of farms with 1-49 acres decreased from 20.7 percent in 1949 to 13.2 percent in 1969. Farms with 50-499 acres also declined as a percentage of all farms. The percentage of farms with 500-999 acres increased from 6.5 percent in 1949 to 14.6 percent in 1969 while farms of over 1000 acres increased from 1.5 percent in 1949 to 8.6 percent in 1969.

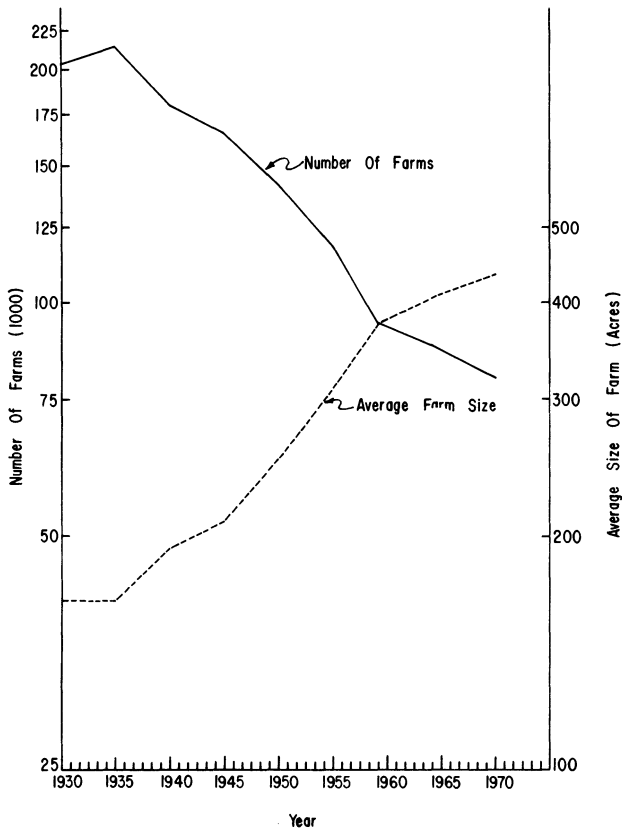


Figure 9. Trends in Farm Numbers and Average Farm Size in Oklahoma, 1930-1969

Farm Labor

Consolidation of farms into more efficient, larger units has reduced the labor requirements in agriculture. Population on farms has declined accordingly. In 1930, 42.6 percent of Oklahoma's population lived on farms (Figure 12). By 1969, the percentage had declined to 6.2 percent. Nationally, farm population accounted for 24.9 percent of total U.S. population in 1930 but only 4.6 percent in 1969.

Figure 13 shows changes in farm wage rates and number of farm workers in Oklahoma from 1950 to 1972. The average U.S. factory wage rate is also included for comparison. In 1950, 255 thousand family and hired workers were employed on Oklahoma farms. By 1969, the number

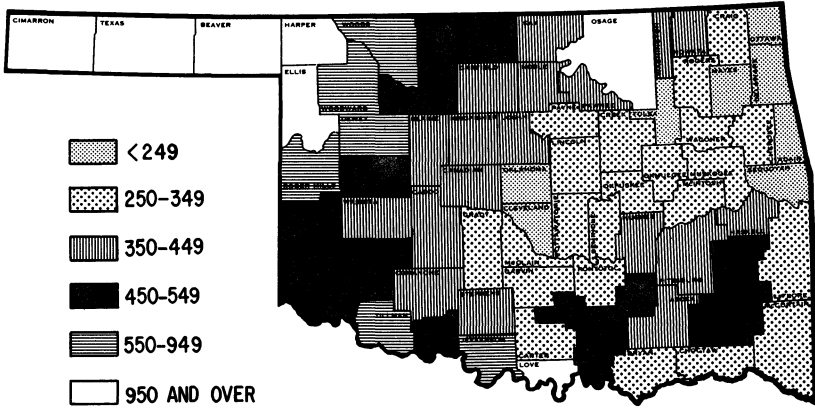


Figure 10. Average Size by Counties, Oklahoma, 1969

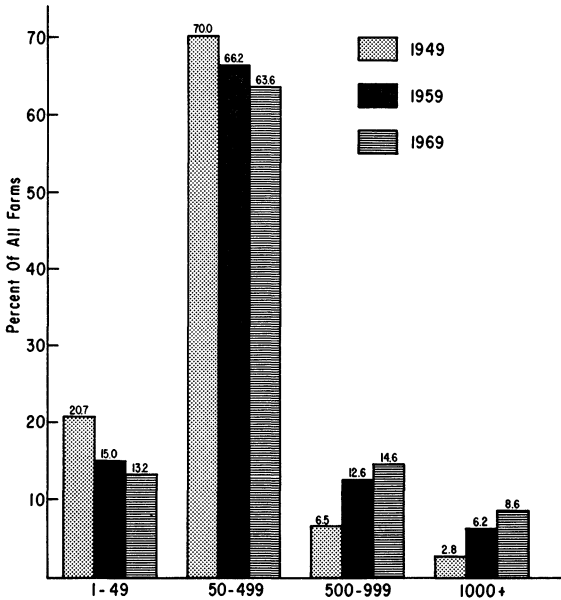


Figure 11. Percentage of Farms in Various Acreage Classifications 1949, 1959, 1969

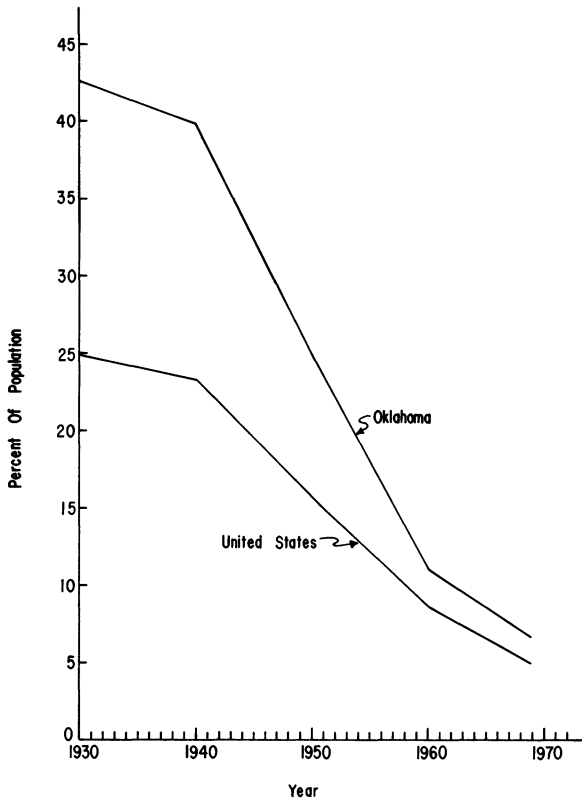


Figure 12. Percentage of Population Living on Farms, Oklahoma and United States, 1930-1969

of farm workers had declined by over one-half to 125 thousand. The slope of the semi-log plot of farm workers is the steepest (the rate of decline the largest) over the 1950 to 1956 period. The rate of decline moderated somewhat from 1956 to 1965 and very little change in farm worker numbers occurred between 1968 and 1972.

The per hour wage rate for hired farm workers in Oklahoma has remained well below the average wage rate earned by U.S. factory workers. The percentage rate of increase in the two series, however, has been roughly comparable.

Farm Land and Buildings

Land values have increased sharply over the last three decades. In 1940 the average value of land and buildings in Oklahoma farms was

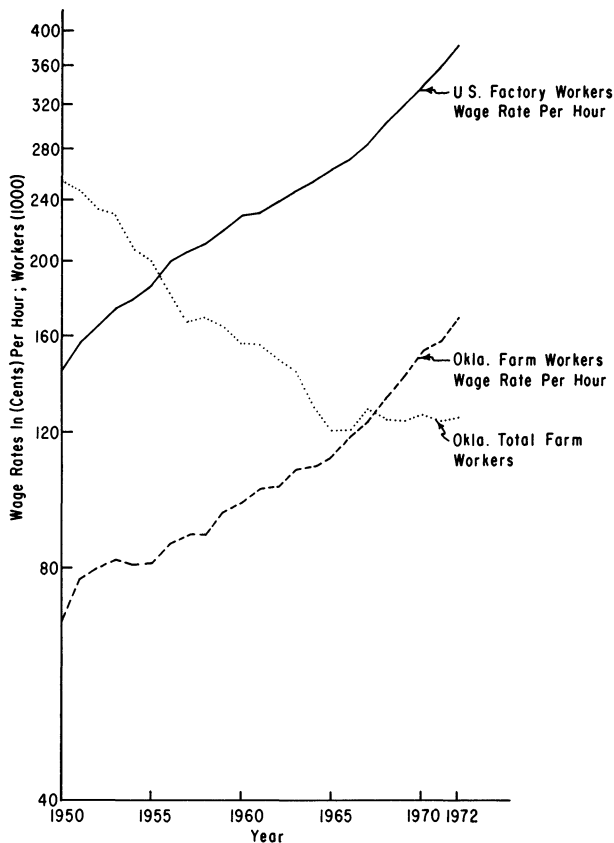


Figure 13. Trends in Wage Rates of U.S. Factory Workers and Oklahoma Farm Workers and Trends in the Number of Oklahoma Farm Workers, 1950-1972

\$23.88 per acre. By 1949, the per acre value was \$51.42 and the 1969 Oklahoma farm land and building value averaged \$172.58 per acre (Figure 14). On a per farm basis, land and building investment has increased even more rapidly due to increases in farm size as well as increases in land price per acre. During the 1949 to 1969 period, the value of land and buildings per farm increased by nearly sixfold from \$13,016 to \$74,838.

The tenure arrangements of farms operating the land has also changed significantly. Even with the massive increases in capital investment in land and buildings just noted, the percentage of farm operators

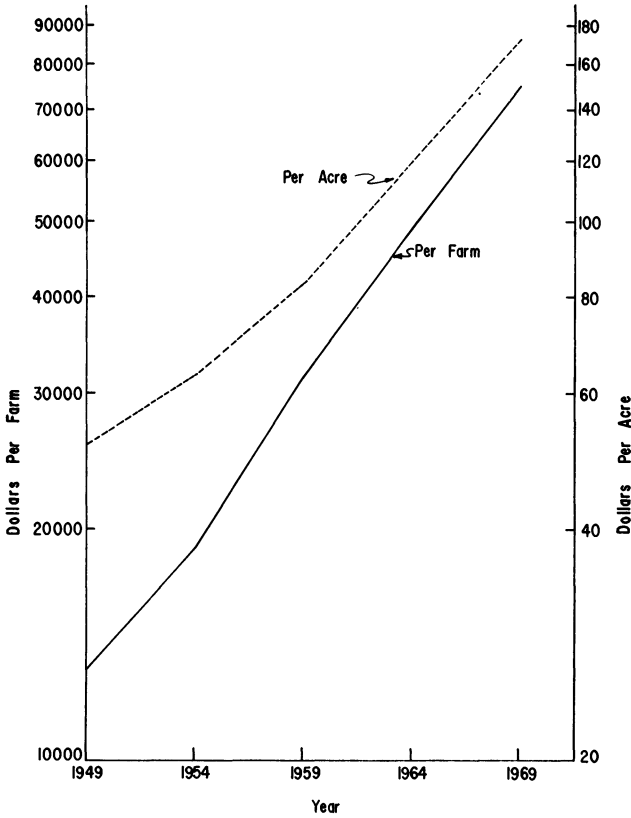


Figure 14. Value of Farmland and Buildings, Average Per Farm and Per Acre, 1949-1969

who own part or all their farm increased from 75.2 percent in 1954 to 85.9 percent in 1969 (Figure 15). Meanwhile, tenant farming declined from 24.3 percent of all farms in 1954 to 14.1 percent in 1969.

The proportions of land in farms operated by full owners, part owners and tenants are also shown in Figure 15. While most farms are operated by full owners, most of the agricultural land is controlled by part owners. Summing the full and part owner shares of land in farms show trends similar to the combined shares of total farms. In 1954, 77 percent of all farm land was operated by full and part owners. In 1969, the figure was 88 percent. The upward trend in both full and part farm ownership by farm operators has been facilitated by outmigration of low income tenant farmers to off-farm employment and pressure on farm

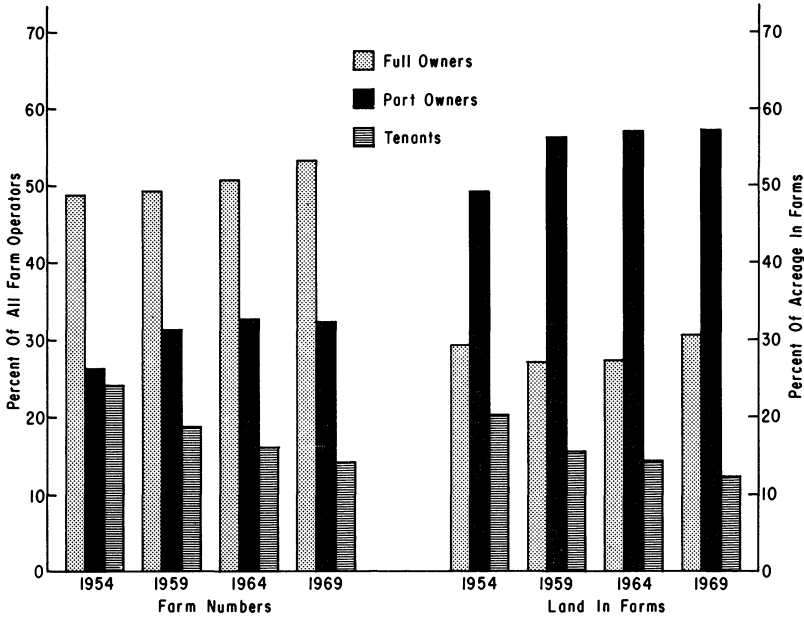


Figure 15. Farms and Acreage by Tenure of Operator, Oklahoma, 1954-1969

owners to purchase additional land as a means of realizing economies of size so as to earn a reasonable standard of living.

Farm Machinery

With the increased use of modern machinery one farmer can accomplish more work than several farm workers could complete 30 years ago. In 1969, total investment in farm machinery and equipment in Oklahoma was \$594 million. Investment data are not available from earlier Censuses of Agriculture, but numbers of specific types of farm machinery have been reported. Figure 16 shows changes in the numbers of tractors and trucks between 1939 and 1969, pickup baler numbers from 1949 to 1959, and grain combine numbers between 1944 and 1954 and from 1964 to 1969.

While farm numbers declined by 49 percent from 1934 to 1969, the number of farm tractors more than doubled during this period. In 1934, only one in four Oklahoma farmers owned a tractor. In 1969, every four farmers owned, on the average, five tractors. Truck numbers, including pickup trucks, have increased substantially. In fact, after 1964, Oklahoma

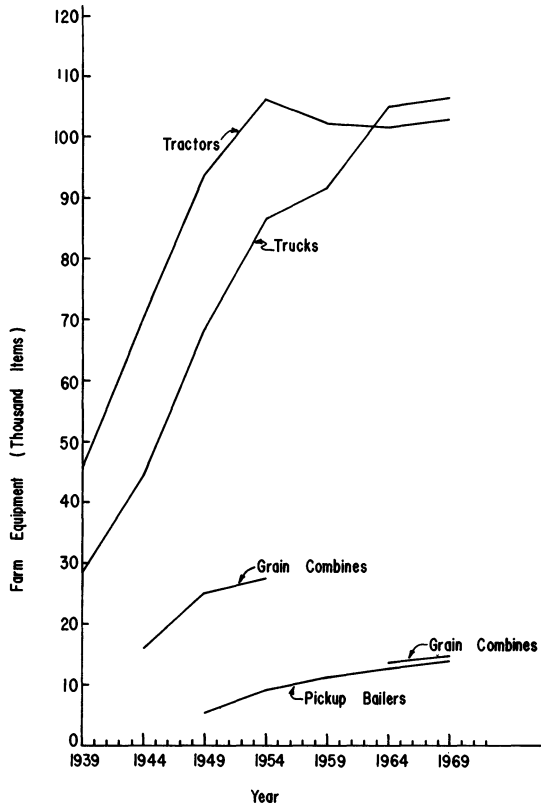


Figure 16. Changes in Numbers of Farm Tractors, Trucks, Grain Combines and Pickup Balers, 1939-1969 (Data not available for combines in 1959)

farmers have owned more trucks than tractors. The number of pickup balers has increased steadily but grain combine numbers have declined from the levels of the early fifties. The increased use of custom combine services by Oklahoma farmers and some reduction in wheat harvested acreage have reduced the number of combines required in recent years.

Fertilizer Use and Irrigated Acreage

Mammoth increases in fertilizer applications and acreage irrigated have enabled present day farmers to produce a given level of output (say 1000 bushels of wheat or grain sorghum) with substantially fewer acres of land than were required in 1949. Fertilizer applications on Oklahoma

farmland have increased from 146 thousand tons in 1949 to 625 thousand tons in 1969 (Figure 17). The implied average application rate per acre on harvested cropland and cropland used for grazing increased from 20 pounds per acre in 1949 to 95 pounds per acre in 1969. During the same twenty year period, land irrigated on Oklahoma farms increased 15 fold from 34 thousand acres in 1949 to 524 thousand acres in 1969.

Production Expenses

Changes in total and component categories of farm production expenses in Oklahoma are depicted in Figure 18. Total farmer outlay for production items increased from \$370 million in 1949 to over \$1.2 billion in 1972. In 1972, the largest single category of expense was live-

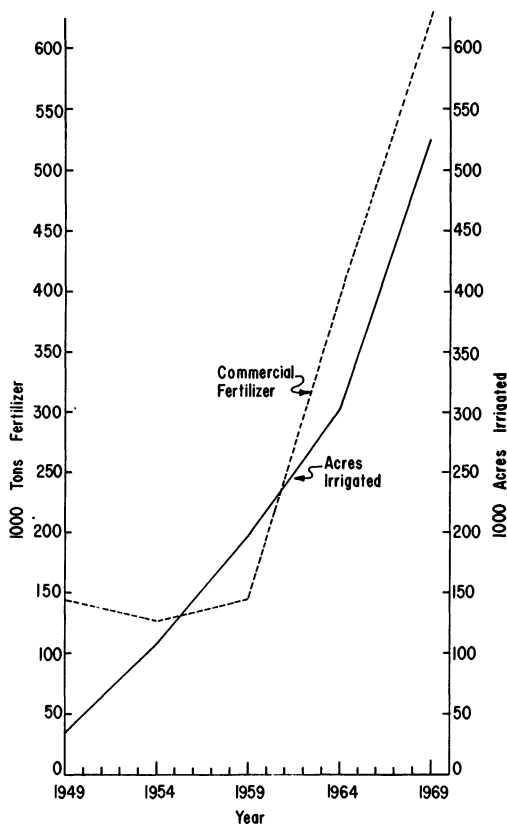


Figure 17. Trends in Commercial Fertilizer Application and Irrigated Land On Oklahoma Farms, 1949-1969

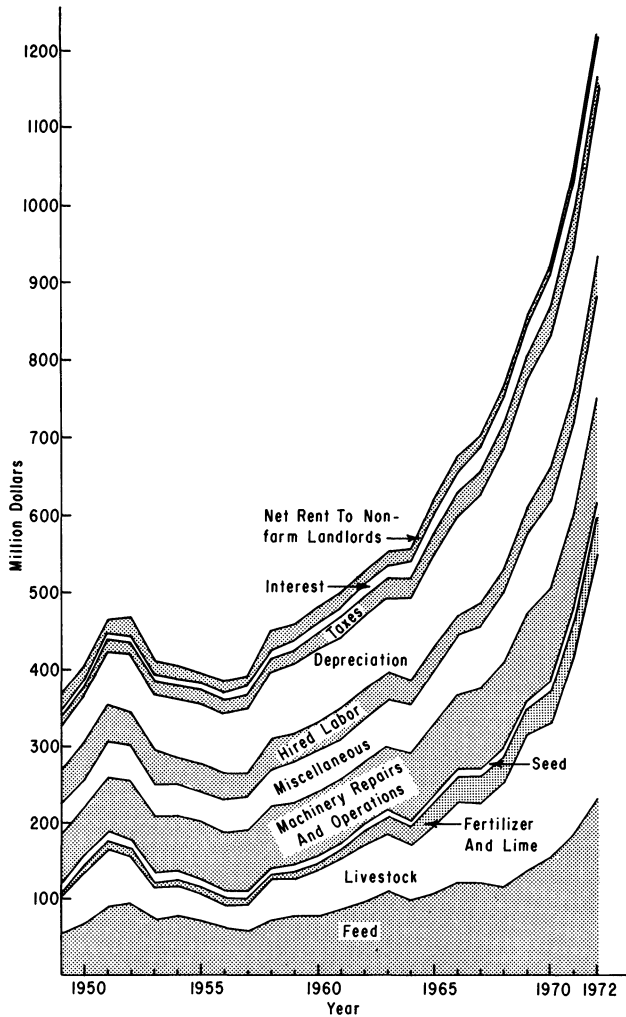


Figure 18. Trends in Oklahoma Farm Production Expenses, 1949-1972

stock purchases which accounted for one-fourth of all production expenses at \$318.2 million. In 1949, livestock purchases made up 17.7 percent of total production expenses.

Interest expense and fertilizer and lime expense have shown the largest percentage increase over the period. Interest payments increased ten fold from \$4.9 million in 1949 to \$48.5 million in 1972. Fertilizer and lime expense was over 7 times larger in 1972 than in 1949 (\$6.1 and \$46.8

million in 1949 and 1972 respectively). Substantial increases have also been recorded for other expense categories. During the 1949 to 1972 period, machinery fuel and repairs expense doubled, miscellaneous expense and taxes tripled and the dollar outlay for feed purchases quadrupled. Even though farm wage rates per hour more than doubled between 1949 and 1972, hired labor expense increased only 12 percent due to reduced employment of farm workers.

Oklahoma farmers have readily adopted new technologies in the form of improved seed varieties, feed additives and high protein feed, herbicides, pesticides and more efficient machinery. Even though prices of capital inputs have increased, their productivities are higher and their prices lower *relative* to the productivities and prices of the inputs they replace (land, labor and animal power). Consequently, the input structure of agriculture has shifted away from a major reliance on farm based resources to inputs developed and supplied by the nonfarm sector.

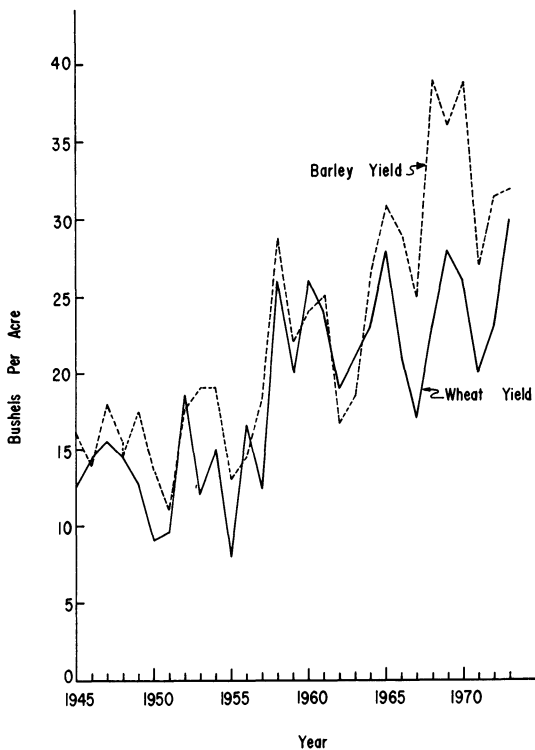


Figure 19. Trends in Wheat and Barley Yield Per Acre on Oklahoma Farms, 1945-1972

Productivity

Considerable gains in farm productivity have accompanied agriculture's changing resource structure. Trends in crop output per acre, output per manhour of labor and output per unit of all inputs combined reflect substantial increases in farm productivity. Figures 19-21 depict per acre yield trends for major Oklahoma crops since 1950. Weather and other uncontrollable factors cause considerable year-to-year fluctuations in crop yields, but the overall trend is upward. The dramatic increases in fertilization and irrigation noted earlier (Figure 17), expanded use of pesticides, and the development and rapid farmer adoption of improved seed varieties have contributed significantly to the yield trends.

Data on output per manhour and output per unit of all inputs are not available for Oklahoma agriculture. However, these productivity

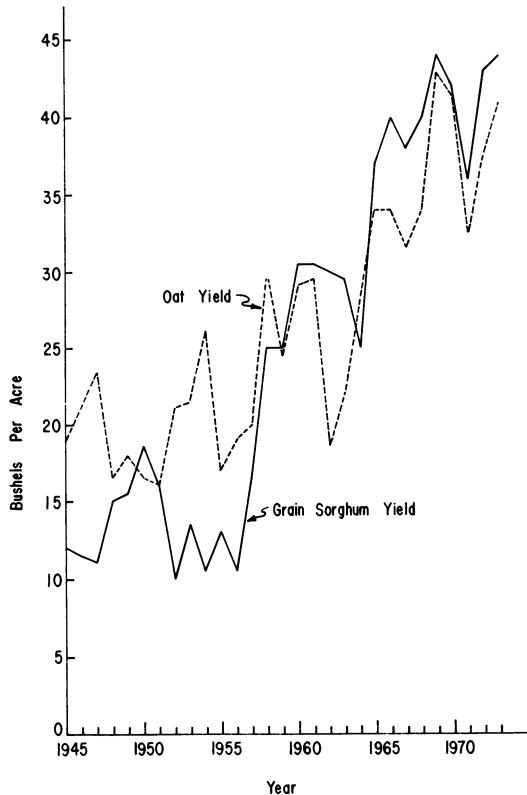


Figure 20. Grain Sorghum and Oat Yields Per Acre on Oklahoma Farms, 1945-1973

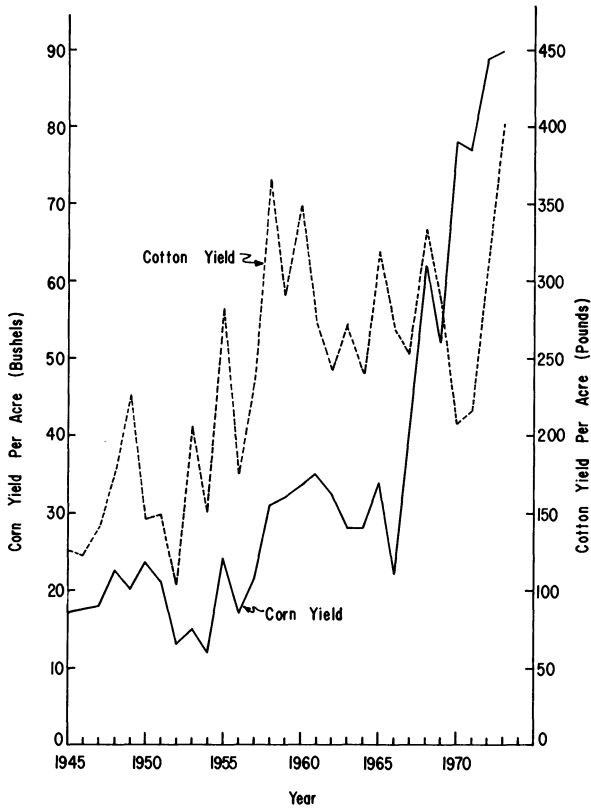


Figure 21. Corn and Cotton Yields Per Acre on Oklahoma Farms, 1945-1973

measures are available for U.S. agriculture and are presented in Figures 22 and 23 as indicators of approximate productivity changes in Oklahoma. Estimates of output per manhour for nonfarm U.S. industries are presented for comparison but recent data on overall input productivity are unavailable for non-farm industries. Labor productivity in the farm sector has increased faster than in the industrial sector. In 1972 farm output per manhour of labor was 3.74 times greater than in 1950. During this same time output per manhour in non-farm industries increased by a multiple of 1.72.

The trend in agricultural output per unit of all inputs combined (Figure 23) has been steadily upward but at a slower rate than labor productivity. The overall productivity index (1967 = 100) increased from

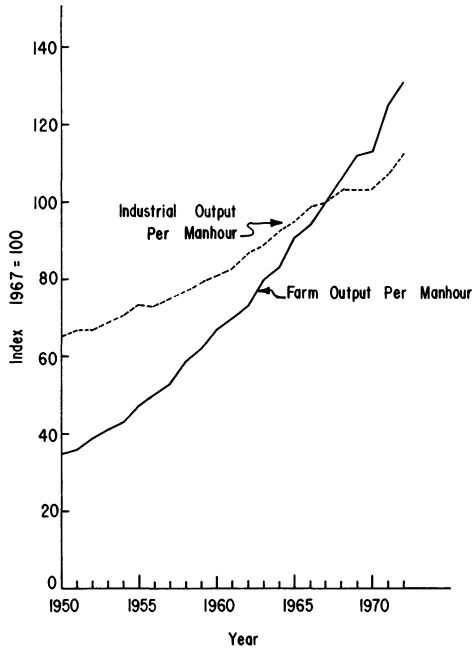


Figure 22. Farm and Industrial Output Per Manhour, United States, 1950-1972

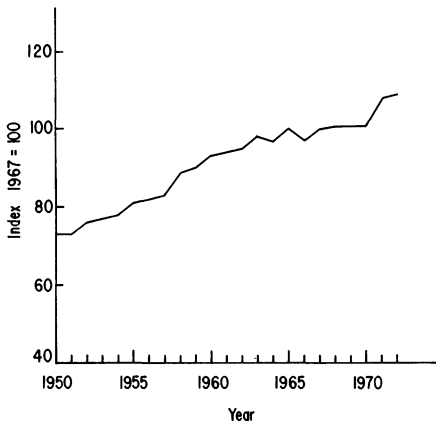


Figure 23. Farm Output Per Unit of All Inputs, United States, 1950-1972

73 in 1950 to 109 in 1972. The 1972 index value of 109 indicates that 9 percent more output was produced in 1972 than in 1967 from a given combined level of inputs.

Legal Organization of Farms

The dominant legal organization of Oklahoma farmers, as well as U.S. farms, is the single proprietorship. In 1969, 88.5 percent of Oklahoma farms with sales of \$2,500 and over (class 1-5 farms) were individual or family owned, while the U.S. figure was 85.4 percent (Figure 24). The percentage of class 1-5 farms organized as partnerships in 1969 was 10.7 percent in Oklahoma and 12.8 percent for the U.S. The corporate form

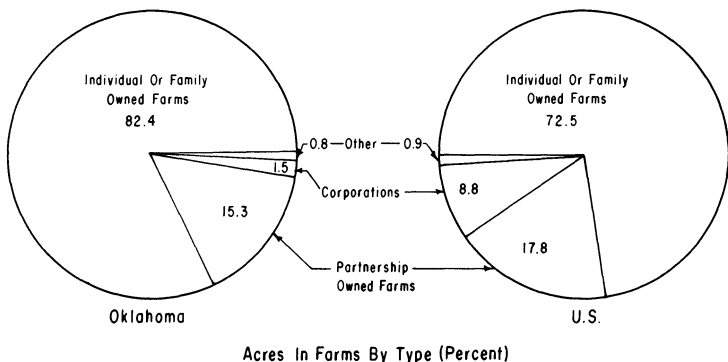
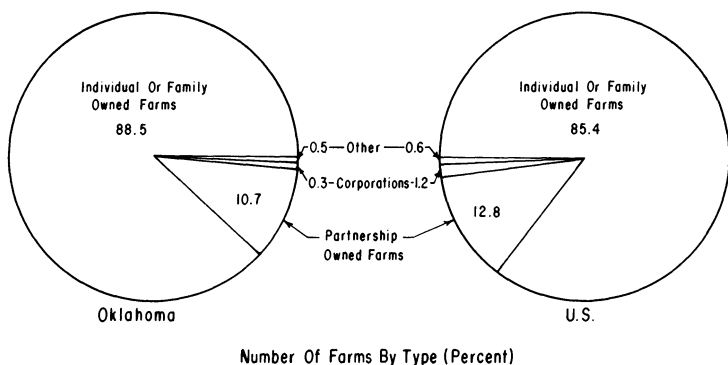


Figure 24. Proportion of Farm Numbers and Acres in Farms with Sales of \$2500 and Over by Type of Organization, Oklahoma, 1969

of organization accounts for very few farms. Only .3 percent of class 1-5 farms in Oklahoma were organized as corporations in 1969 of which 91 percent had 10 or fewer stockholders. Nationally 1.4 percent of class 1-5 farms were organized as corporations in 1969. Data on the legal organization of farms with sales under \$2,500 were not reported but nearly all of these small farms were undoubtedly owned by individuals or families. The Census of Agriculture first began collecting information by type of farm organization in 1969 so comparisons from earlier years are not available.

In terms of total acreage farmed, the percentages for farms organized as partnerships and corporations were somewhat higher. Partnerships in Oklahoma operated 15.3 percent of the acreage in all class 1-5 farms (Figure 24). The figure for corporations was 1.5 percent while 82.4 percent of the acreage was controlled by individuals or families. The average size of farms (with sales of \$2500 and over) organized as partnerships was 885 acres, 2400 acres for corporate farms and 575 acres for individual and family owned farms.

Figure 25 shows the proportion of Oklahoma agricultural commodity sales by type of farm organization. In Oklahoma, corporate farms account for 12.2 percent of 1969 agricultural product sales (from class 1-5 farms). Partnerships sold 14.6 percent and individual and family owned farms marketed 72.8 percent.

Changes In Crop Acreages and Livestock Numbers

The composition of agricultural output in Oklahoma has changed markedly in recent decades. As noted earlier, sales of livestock and livestock products have accounted for an increasing share of farm receipts over the last 30 years while crops sales have declined in relative im-

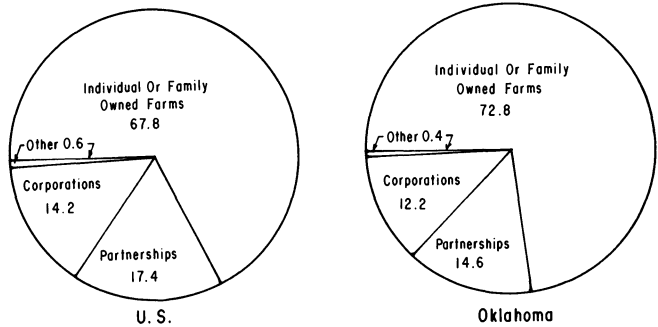


Figure 25. Proportion of Value of Products Sold by Type of Organization (Percent), Oklahoma 1969.

portance. Sizable adjustments have also occurred within these two broad categories of agricultural output.

Since 1930 acreages of wheat, hay and barley have increased while corn and cotton acreages have declined (Figure 26). Wheat acreage increased from 4,868 thousand acres planted in 1929 to a high of 7,481 thousand acres in 1949. Governmental acreage control programs reduced wheat acreages to under 5,000 thousand acres between 1955 and 1964. Planted acreage increased after 1964 with farmers using part of their wheat land for cattle grazing. Hay acreage increased from 965 thousand acres in 1929 to 1710 thousand acres in 1973. Corn and cotton acreages have declined substantially. In 1967, 61 thousand acres were planted to corn compared to 3,230 thousand acres in 1929. Spurred by increased demand for feed and silage by area feedlots, corn planted acreage increased to 128 thousand acres in 1973 Cotton acreage declined from 4,114 thousand acres in 1929 to 547 thousand acres in 1973.

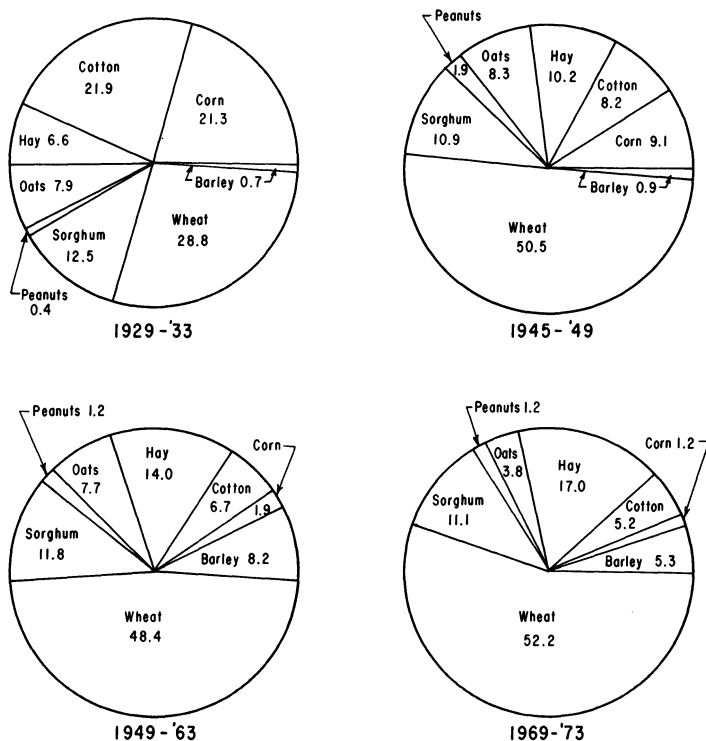


Figure 26. Relative Importance of Major Crops in Oklahoma, Selected Acreage of Total Cropland, 1929-1973 (Percent)

Considerable changes have also occurred within the livestock category (Figures 27-29). Dramatic growth in cattle and calf enterprises has increased the relative importance of the livestock sector in Oklahoma despite reduced production of hogs, sheep, farm chickens, eggs and milk. The number of all cattle and calves on Oklahoma farms increased from 1,814 thousand head in 1929 to 6,020 thousand head in 1974. During this same period, dairy cattle numbers declined from 631 thousand to 130 thousand head. Hog numbers declined from 1,225 thousand head to 315 thousand head between 1929 and 1973. Sheep numbers have varied considerably over the period. The trend since 1963 has been downward. Between 1963 and 1973 sheep on Oklahoma farms declined from 301 thousand head to 120 thousand head. The number of farm chickens (excluding broilers) has dropped from 14,577 thousand head in 1929 to 2,910 thousand head in 1973. Broiler numbers, however, have increased sharply. Between 1950 and 1973 the broiler population increased from 2,909 thousand head to 23,650 thousand head.

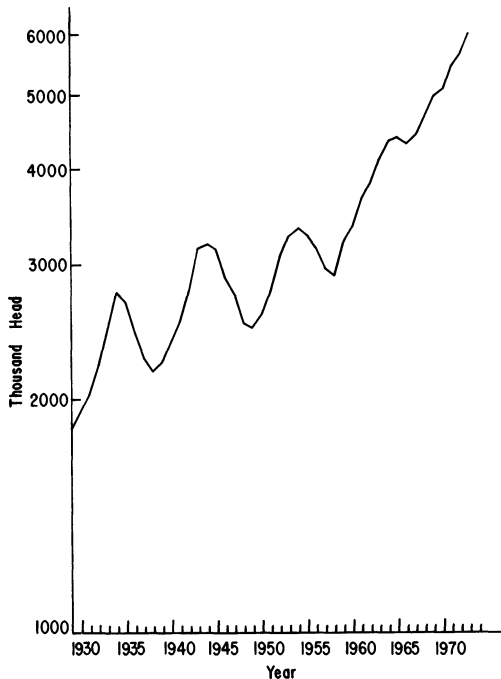


Figure 27. Number of Cattle and Calves on Oklahoma Farms, 1929-1974

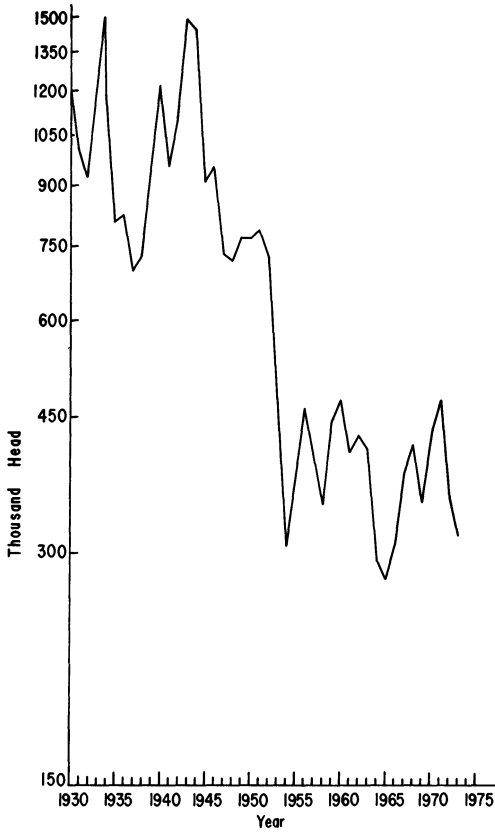


Figure 28. Hogs on Oklahoma Farms January 1, 1929-1973

Changes In Oklahoma and Regional Shares of U.S. Farm Production

The agricultural commodity trends presented in the previous section referred only to Oklahoma. On the following pages, regional changes of production are graphed for six major commodities produced in Oklahoma. Oklahoma's share as well as regional shares of national production are presented for the years 1950, 1960 and 1972 to illustrate locational shifts in production. The regions used are outlined in Figure 30.

Cattle and Calves

Oklahoma farmers' share of cattle and calf production increased from 3.8 percent in 1950 to 5.0 percent in 1972 (Figure 31). Total U.S.

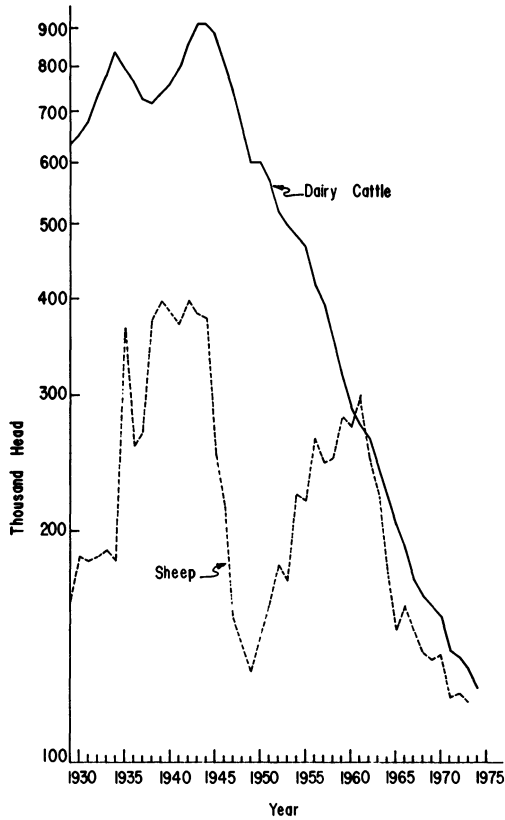


Figure 29. Dairy Cows and Sheep on Oklahoma Farms January 1, 1949-1972

beef production increased 101 percent between 1950 and 1972 while beef output in Oklahoma jumped 160 percent. Regional shifts in cattle and production over the 22 year period have been from the North Atlantic and East Central regions toward the South Central and Western regions. The rapid increase in the number and size of commercial feedlot operations in Oklahoma, Texas, Colorado, California and other southwestern and western states has accounted for much of the relative rise in beef output in the Western and South Central regions. Carrying capacity of cow and stocker herds also has been expanded through adoption of improved grasses and fertilization, shifts in land-use from crops to pasture and increased use of wheat for grazing.

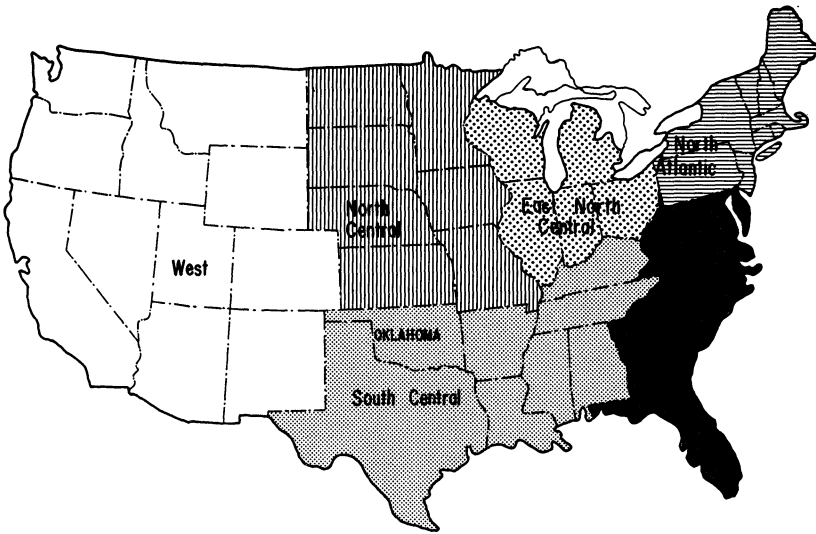


Figure 30. Agricultural Regions of the U. S.

Wheat

Allotment and set-aside levels administered under federal farm programs have had a major impact on wheat harvested acreage. United States harvested wheat acreage remained below the 1950 acreage between 1954 and 1973. Yet U.S. wheat production increased 50 percent over the two decade period due to increased yields. Over the 1950 to 1972 period, Oklahoma farmers produced on the average 6.53 percent of the nation's wheat. Between 1950 and 1972 Oklahoma's share ranged from 2.57 per-

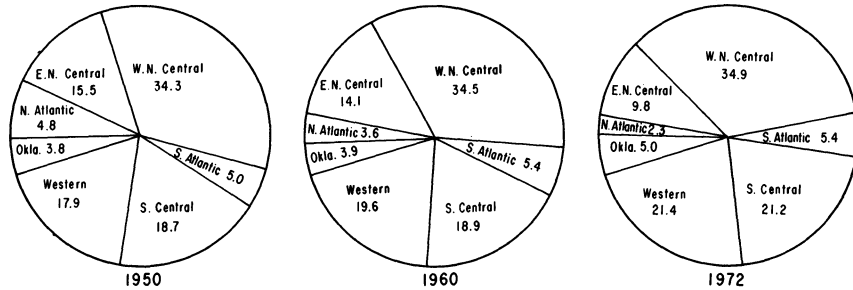


Figure 31. Regional Shares of U.S. Cattle and Calf Production 1950-1972 (Percent)

cent in 1955 to 10.10 percent in 1965. Most of the variation was due to weather induced yield fluctuations as Oklahoma's share of wheat harvested acreage has remained fairly stable at between 6.5 and 8.5 percent. Regional shares of U.S. wheat production also exhibit considerable year to year fluctuation due to weather influences on yield (Figure 32). A slight movement of wheat production away from the North and South Atlantic states has occurred in the last 20 years.

Dairy Products

Milk production in Oklahoma has declined substantially in the last twenty years. In 1950, 1.98 million pounds of milk were produced in Oklahoma. By 1972 the figure had declined 1.24 billion pounds. Nationally milk production reached its peak in 1964, trended downward through 1969, recovered somewhat in 1970-1972 and declined again in 1973. Low labor returns in dairying have caused farmers in the U.S., and to a larger extent in Oklahoma, to shift from milk production to more profitable and less labor intensive enterprises such as beef production.

Oklahoma accounted for only 1.1 percent of the nation's milk production in 1972 compared with 1.8 percent in 1950 (Figure 33). Regional shifts in U.S. milk production since 1950 include increased production in the Western, North Atlantic and South Atlantic regions and relative production declines in the three central regions.

Cotton

Cotton's relative importance as a source of income for Oklahoma farmers has declined sharply over the last twenty years. In 1950, over 10 percent of Oklahoma's farm receipts were from cotton sales. By 1972 the percentage had dropped to 2.6 percent. Nationally cotton production has also declined in relative importance. Competition from synthetic fibers caused cotton prices to decline relative to the prices of other

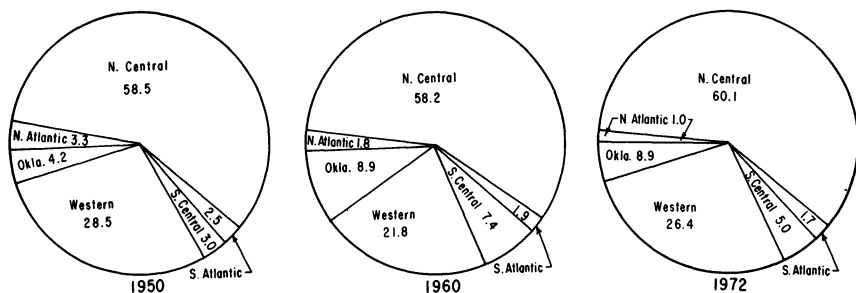


Figure 32. Regional Shares of U.S. Wheat Production, 1950-1972 (Percent)

commodities that compete for agricultural resources. Average annual acreage planted to cotton in Oklahoma declined from 1.31 million acres during 1950-52 to .51 million acres in 1970-1972, a reduction of 61 percent. Over the same period, U.S. cotton acreage dropped by one-half.

Regional shifts in cotton production have been away from the South Atlantic states to the Western states where much of the cotton acreage is irrigated (Figure 34). The largest cotton producing states continues to be the South Central region with Texas, Mississippi and Arkansas accounting for about one-half of U.S. cotton production.

Poultry and Eggs

Total production of poultry and eggs in the U.S. increased 85 percent between 1950 and 1952 while in Oklahoma only a 23 percent increase was realized. All of the Oklahoma increase was due to dramatic growth in turkey and broiler production. In 1972, 160.2 billion pounds of turkeys and 77.4 billion pounds of broilers were produced in Oklahoma compared with 8.9 and 7.8 billion pounds respectively in 1950. During this time, egg production declined by nearly two-thirds.

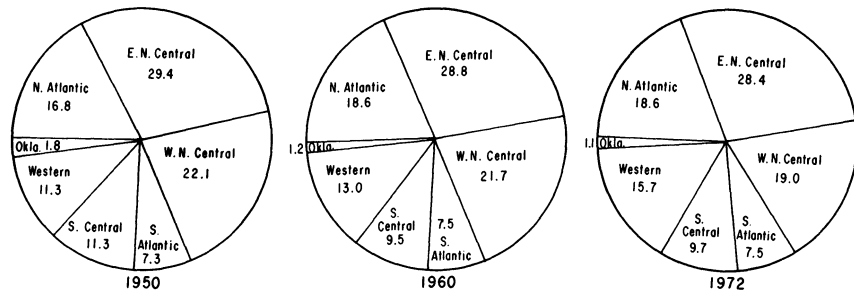


Figure 33. Regional Shares of U.S. Milk Production, 1950-1972 (Percent)

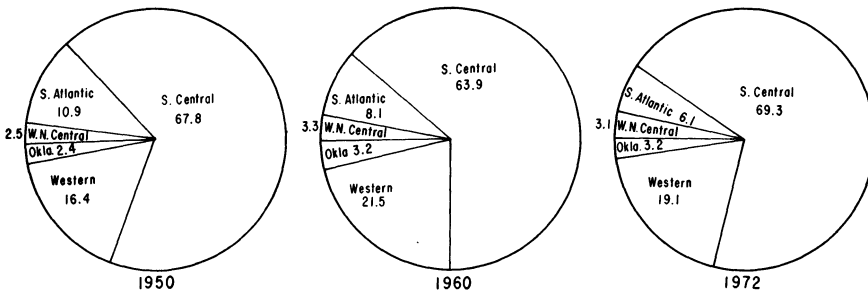


Figure 34. Regional Shares of U.S. Cotton Production, 1950-1972

Shifts in locational production of poultry and eggs have been more pronounced than for any other major agricultural commodity (Figure 35). Overall, U.S. poultry production has declined in the northern regions and become more concentrated in the southern regions due to vertical integration, favorable climate and cheaper labor. Both the South Atlantic and South Central regions increased their share of poultry production while production in the West and East North Central regions and the North Atlantic region declined substantially as a percent of total U.S. poultry production.

Hogs

Pork production in the U.S. has increased only slightly over the last two decades with 20.9 billion pounds produced in 1950 and 21.6 billion pounds in 1972. Oklahoma's share of hog production during this time has declined from 1.8 to 1.3 percent. Farm operators in Oklahoma have opted for diverting resources from hog production, which has had a relatively static long term demand, to cattle production, which has had a rapidly expanding long term demand. The abundant feed supply in the Corn Belt has, perhaps, given that area a competitive advantage in hog production over the years.

As illustrated in Figure 36, the two North Central regions continue to dominate in U.S. hog production. In 1972, the West and East, North Central regions accounted for 79.1 percent of U.S. hog production, up from 76.7 percent in 1950.

Summary

Changes in Oklahoma agriculture have been wide spread and dramatic. This study summarizes some of the changes that have occurred and are occurring in Oklahoma's farm resources, output and income.

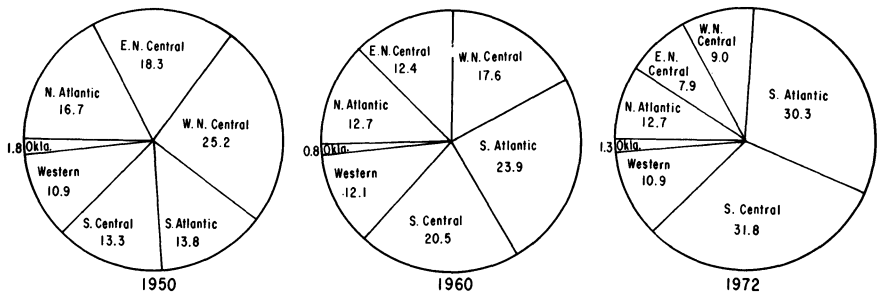


Figure 35. Regional Shares of U.S. Poultry and Egg Production, 1950-1972 (Percent)

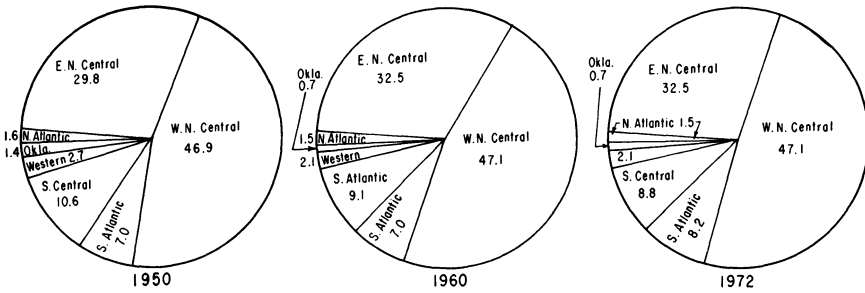


Figure 36. Regional Shares of U.S. Hog Production, 1950-1972 (Percent)

The average size of Oklahoma farms increased from 165 acres in 1930 to 434 acres in 1969. Farm numbers declined by 59 percent over this period. Hired and family labor numbers show a similar downward trend. In 1930, 42.6 percent of Oklahoma's population lived on farms compared with only 6.2 percent in 1969.

The use of capital inputs, such as machinery and fertilizer, on Oklahoma farms has increased substantially. For example, fertilizer applications increased from 146 thousand tons in 1949 to 625 thousand tons in 1969. Irrigation of farmland has also been on the increase with fifteen times more acreage irrigated in 1959 than in 1949.

The single proprietorship continues to be the dominant form of legal organization of Oklahoma farms. The corporate form of organization accounted for only .3 percent of Oklahoma farms with \$2500 or more of sales but sold 12.2 percent of all agricultural sales in 1969.

Vast changes have occurred in the composition of agricultural output. During the 1946-1950 period livestock and livestock products accounted for 51.9 percent of farm income while crops comprised 46.6 percent. By 1972, livestock's share increased to 72.1 percent while crop sales as percent of total farm income declined to 19.9 percent. The increase in the livestock share was due to mammoth increases in cattle and calf sales, while dairy, hogs and poultry lost ground as contributors to farm income. In general Oklahoma farmers have increasingly specialized in cattle and calf production in the livestock sector and wheat production in the crop sector.

Trends in Oklahoma's share of national production of crop and livestock categories also indicate increased specialization. Total U.S. beef production increased by 101 percent between 1950 and 1972 while beef production in Oklahoma jumped 160 percent. Increases in Oklahoma

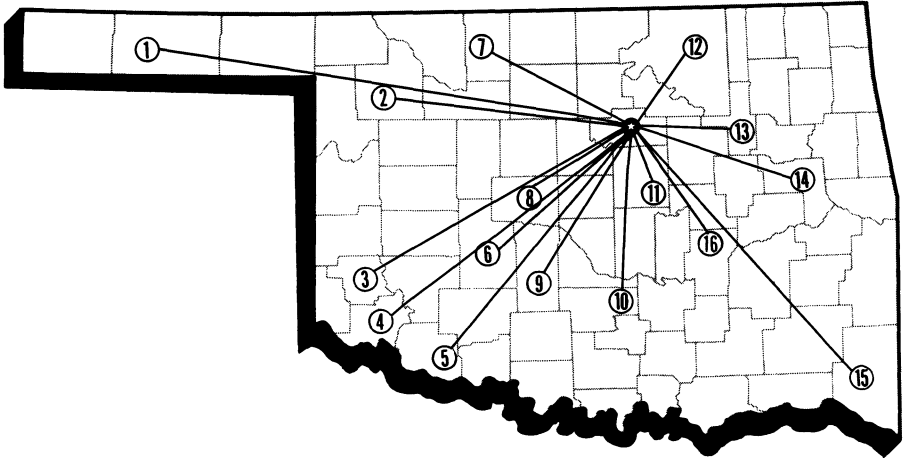
and national wheat production have been similar. However, Oklahoma's share of national output of other major crop and livestock categories has declined.

Future changes in resource use and composition of production will likely continue to favor increased use of capital and continued specialization in beef and wheat production. The greater the uncertainty of input and product prices in the future the slower will be the rate of these changes. Agriculture will continue to be a very competitive business. Successful farmers in the future will increasingly use credit and up-to-date managerial skills in the operation of their farming enterprises.

OKLAHOMA

Agricultural Experiment Station

System Covers the State



Main Station — Stillwater, Perkins and Lake Carl Blackwell

1. **Panhandle Research Station — Goodwell**
2. **Southern Great Plains Field Station — Woodward**
3. **Sandyland Research Station — Mangum**
4. **Irrigation Research Station — Altus**
5. **Southwest Agronomy Research Station — Tipton**
6. **Caddo Research Station — Ft. Cobb**
7. **North Central Research Station — Lahoma**
8. **Ft. Reno Livestock Research Station — El Reno**
9. **South Central Research Station — Chickasha**
10. **Agronomy Research Station — Stratford**
11. **Pecan Research Station — Sparks**
12. **Veterinary Research Station — Pawhuska**
13. **Vegetable Research Station — Bixby**
14. **Eastern Pasture Research Station — Muskogee**
15. **Kiamichi Field Station — Idabel**
16. **Sarkeys Research and Demonstration Project—Lamar**