

J. H. LONGWELL, *Director*

Missouri Dairy Markets

Part II.

SOUTHEAST

E. LINWOOD TIPTON AND STEPHEN F. WHITTED

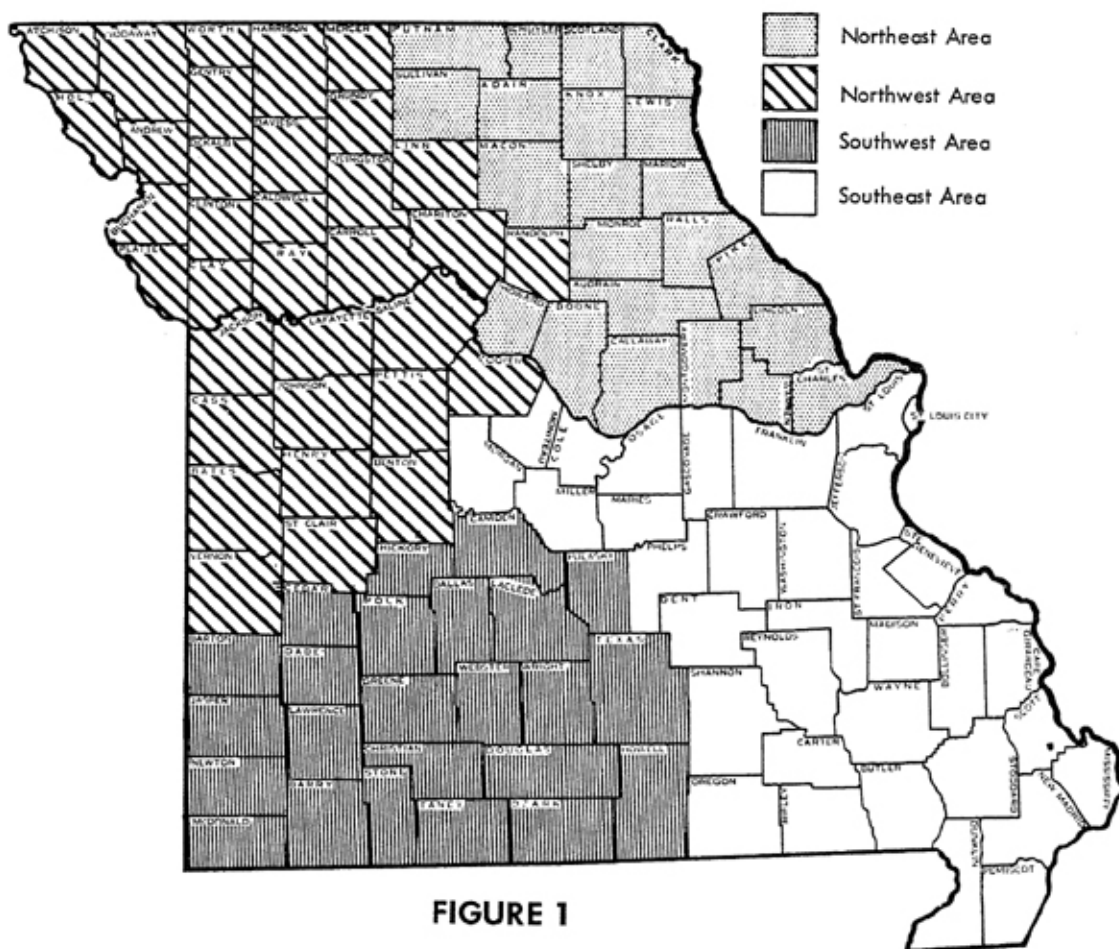


FIGURE 1

(Publication authorized July 29, 1958)

COLUMBIA, MISSOURI

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SUMMARY AND CONCLUSIONS

Although dairying is an important source of farm income in Southeast Missouri, it is not likely that it will become a major enterprise. Cash crops are a better use of the land in the Bootheel area. Here the topography, the climatic conditions, and the composition of the labor force lend themselves to a cash crop type of farm enterprise.

The Ozark upland border area has the potentiality of becoming a more important dairy region. Farms in this area are small, grass and tame hay are plentiful, and the transportation facilities are good.

The concentration of dairying around St. Louis has the competing enterprise of truck farming. However, most of the truck farming is carried on in the river bottom just outside St. Louis city, while the concentration of dairy cattle is in the area surrounding the truck farming section and extends on along the Missouri and Mississippi Rivers. The intensification of dairying in this area has been greatly enhanced by the availability of a nearby market. The price of the land is relatively high, reflecting the alternative of urban uses. Size of farms is generally small.

Sixty-five percent of the population of the area resided in St. Louis and St. Louis County in 1950, compared to 56 percent in 1900. As the population of urban St. Louis increases, the demand for suburban land to construct homes and for industrial development may increase. The truck gardeners will likely move out further and dairy farmers may accept the more attractive alternative of moving their operations to cheaper land further from the consumption center.

Most of the dairy plants in Southeast Missouri are located close to the producers in the northern section of the area. As bulk tank handling of milk becomes more prominent as a method of handling and transporting milk, the distance from the producers to the processing plants may be increased. This movement might eliminate some of the processing plants in Southeast Missouri and force some of the others to convert their operations from bottling to receiving, or possibly distributing, the production of another plant.

Area production per cow is lower than the national average and even lower than the state average.

One of the major problems in marketing dairy products is the seasonality of production. This problem is not as great in the Southeast area as in the state. During April, May, and June the dairy plants in Southeast Missouri receive 28.2 percent of the total yearly receipts, compared to 30.4 percent for the state as a whole.

There is enough equipment available in plants in the area to receive and handle almost three million pounds of milk during an eight hour day. However, only about 65 percent of the capacity is used during normal production periods. Part of the excess capacity is held for day to day variations and part for seasonal surpluses.

Since St. Louis, the largest metropolitan area in Missouri, is located within the area and much of the land is better suited to other enterprises, Southeast Missouri is a deficit milk producing area. A considerable portion of the dairy products needed in the area is shipped in. There is not much movement of dairy products from the area.

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One of 4 similar studies covering the entire state

INTRODUCTION

Southeast Missouri has contributed much to the growth of the dairy industry in the state. Located within the area of this study is St. Louis, the state's largest city. Milk is transported to St. Louis from over half of the counties in the state as well as from other states. Twenty-two of the counties included in this study shipped milk to the St. Louis market in 1955.

This study had three main objectives: (1) to determine the importance of the dairy industry in Southeast Missouri in relation to that of the state as a whole and to other farm enterprises in Southeast Missouri; (2) to discover the marketing methods used, including a consideration of the adequacy of the market outlets for milk producers in Southeast Missouri; and (3) to point out changes which have occurred in the marketing process as a result of recent economic and technological developments.

The area covered includes 34 counties (Figure 1). A total of 94 dairy manufacturing plants are located in the area, but some of these did not receive milk or cream from farmers and therefore were not included in the study.

In addition to information received from the plants data were obtained from various other sources. Among them were the Missouri State Department of Agriculture, the Office of the St. Louis Market Administrator, The Department of Dairy Husbandry, University of Missouri, and publications from the United States Department of Agriculture.

POTENTIAL MILK SUPPLY

Characteristics of the Area.

The physical characteristics of this area are such that it could supply large quantities of dairy products. Farmers in selecting their enterprises, however, tend to choose those which will yield them the greatest net return for the employment of their productive resources. Cash crops, principally cotton and soybeans, have yielded better returns on most farms in this area than dairying. If at some future time price relationships should change so that dairying became

more profitable relative to other enterprises, we would expect milk production in this area to expand greatly. This situation developed to a certain extent during World War II when dairy production was subsidized.

From 1928 to 1939 about 19 percent of Missouri milk cows were located in the Southeast area. The figure went above 20 percent in 1940 and remained there until 1946. In 1947, after the subsidy was terminated, the percentage dropped below 19 percent and remained.

Physical. The soils of Southeast Missouri generally can be classified as falling within three major groups (Figure 2). The Bootheel and extending northward to Cape Girardeau county is best known as the Southeast lowlands.¹ In this area the elevation rarely varies more than 10 feet. This results in a drainage problem. The soil between Crowley's Ridge and the main upland is largely composed of loessial material washed down from the adjoining uplands. The soil east of Crowley's Ridge consists of river deposits brought down by the Mississippi and other large rivers. The average annual rainfall in this area ranges from 45 to 50 inches; however, New Madrid seldom receives less than 50 inches.

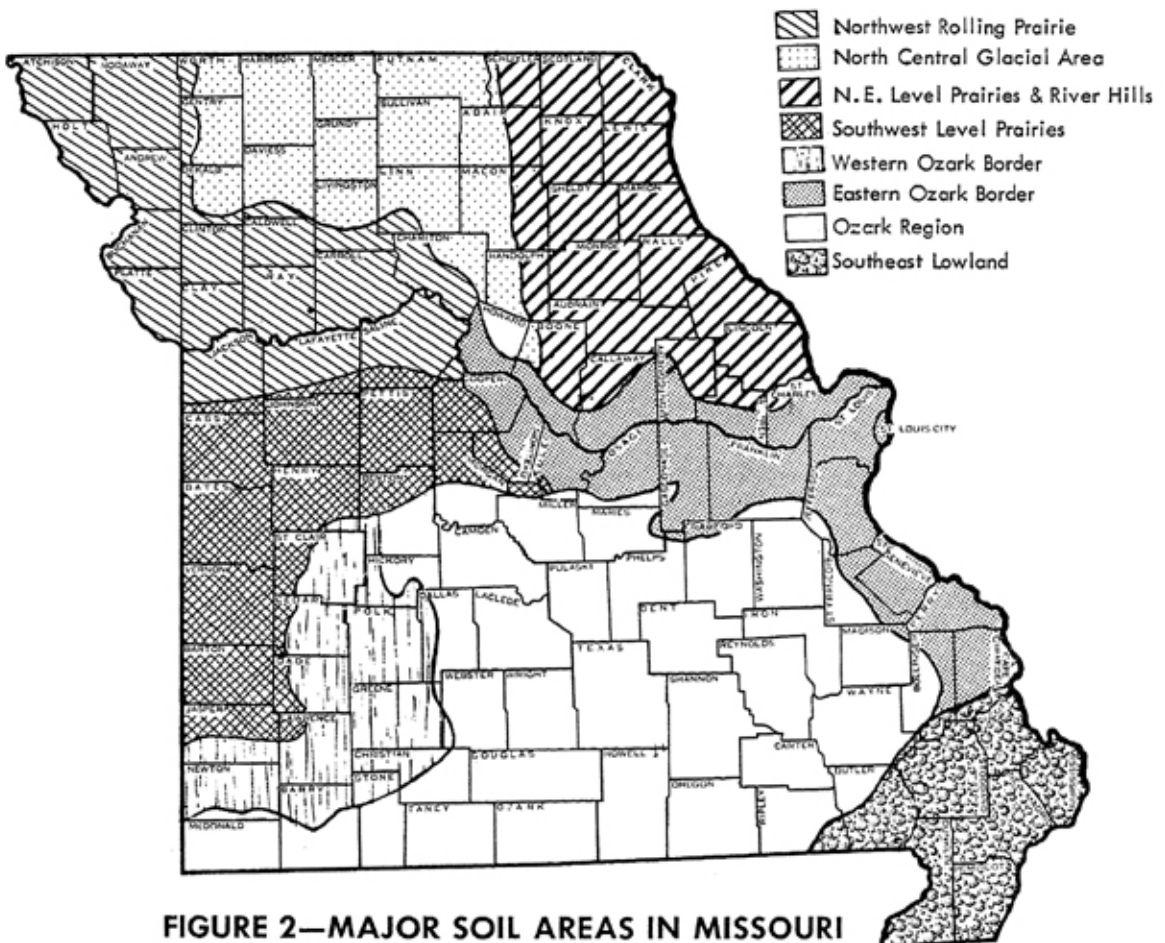


FIGURE 2—MAJOR SOIL AREAS IN MISSOURI

Extending along the Mississippi and the Missouri Rivers, about one county wide, is an area known as the Eastern Ozark Border. This soil also is composed largely of loessial materials washed down from the bordering uplands, plus deposits made by the overflows of the rivers. The elevation of this area is considerably higher than that of the lowlands and the topography is of a rolling nature. The rainfall varies between 45 and 50 inches along the Mississippi River and between 35 to 45 inches along the Missouri River.

The largest geographical area in South Missouri is the Ozark region. Parts of 17 of the 34 counties included in the study are included in this area. The soils of the Ozark region are light in color, relatively low in organic matter, and many of them are stony in nature. They are for the most part timbered, hilly in topography, and rather low in plant food. The Ozark hill soils are the oldest in the state and in most cases are leached. Much of this area is suitable only for timber enterprises and a considerable portion is covered by national forest.

The mean temperature of Southeast Missouri is 58° F. However, the average temperature for July is 80 degrees and for January 36 degrees. The average date of the last killing frost is April 12 and of the first killing frost is October 18.

The Southeast area is classified into five sub-areas according to types of farming (Figure 3).² The lowlands area is noted for its cash crops of cotton and soybeans, plus some livestock. The Ozark area produces a considerable amount of meat as cattle graze on the free ranges covering much of it. Vegetable growing is an important source of income for many farmers located around the urban district of St. Louis. Extending along the Mississippi and Missouri Rivers are relatively large general farms. The principal concentration of dairy production is around the urban area of St. Louis, and extending along the Mississippi and Missouri Rivers. Although this section is the most intensive dairy region in Southeast Missouri, the concentration is not as great as around Springfield. Dairy cows and dairy processing plants are located throughout the area but no portion of it is primarily dairy.

Farm and Population. The population of Southeast Missouri has increased every decade since 1900 (Table 1). The population of Missouri has increased al-

TABLE 1. POPULATION, SOUTHEAST MISSOURI, AND MISSOURI CENSUS YEARS 1900-1960*.

Year	St. Louis County and City	Southeast Missouri	Missouri	Percent of State Total in S. E. Mo.
1900	625,278	1,123,037	3,106,665	36
1910	769,446	1,333,790	3,293,335	40
1920	873,634	1,465,693	3,404,055	43
1930	1,033,553	1,627,669	3,629,367	45
1940	1,090,278	1,773,217	3,784,664	47
1950	1,263,145	1,938,848	3,954,653	49
1960**	1,500,000	2,193,600	4,300,000	51

*United States Census Office.

**Estimate Missouri Bureau of Vital Statistics.

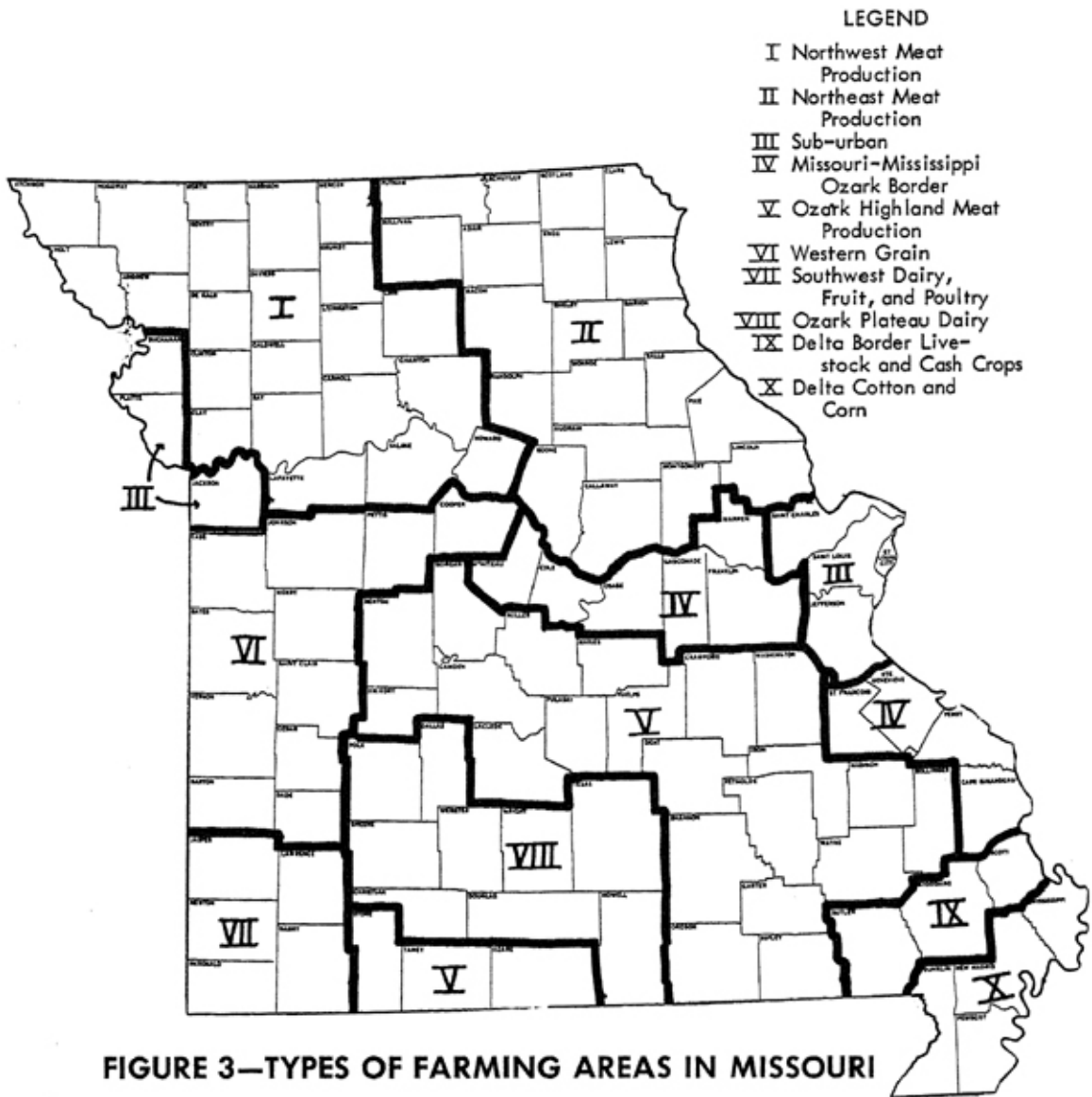


FIGURE 3—TYPES OF FARMING AREAS IN MISSOURI

so but at a slower rate. In 1900, 36 percent of the people in Missouri resided in the southeast part of the state. By 1950, this had increased to 49 percent.

Figure 4 illustrates the comparative rate of increase of population in the state, in southeast Missouri excluding St. Louis county and city, and in St. Louis county including the city. A great deal of the population growth of the area can be attributed to the growth of St. Louis. There has been a movement of rural people to urban centers. This has encouraged the development of suburban living and aided in increasing the population of St. Louis.

The number of farms in both the area and the state has been decreasing (Figure 5). During the depression of the 1930s this downward trend was temporarily halted. At the conclusion of the depression, however, the reduction in number of farms continued (Figure 6).

FIGURE 4
TRENDS IN POPULATION

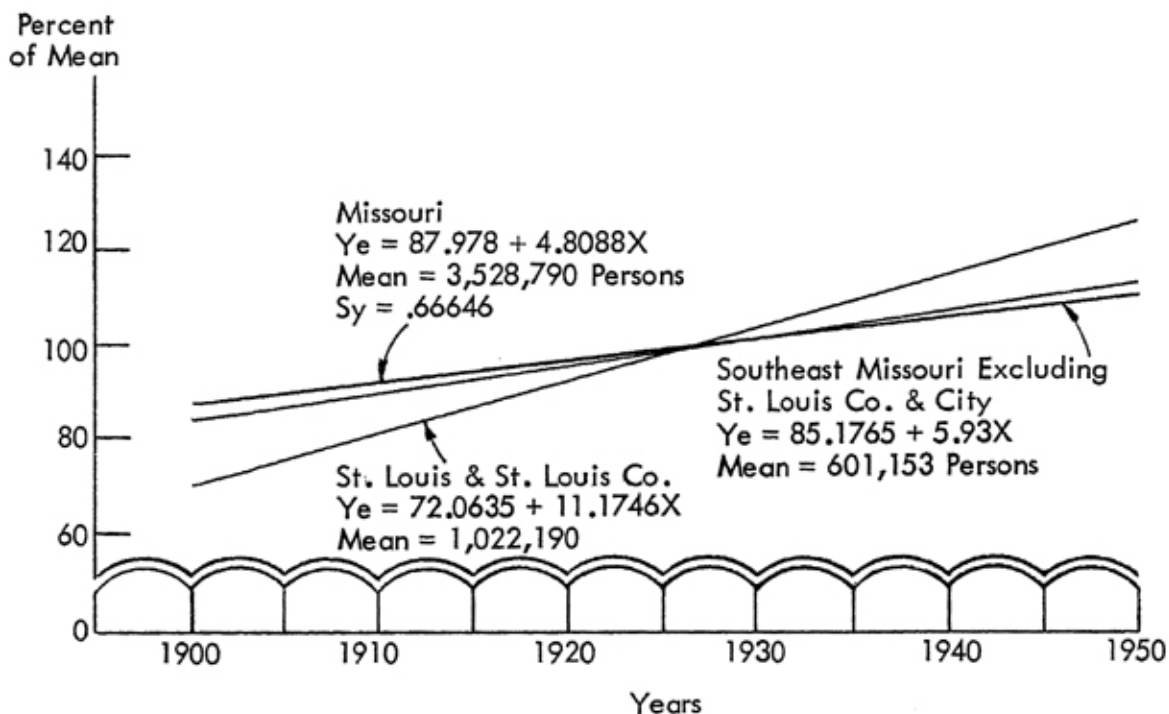


FIGURE 5
TREND IN NUMBER OF FARMS

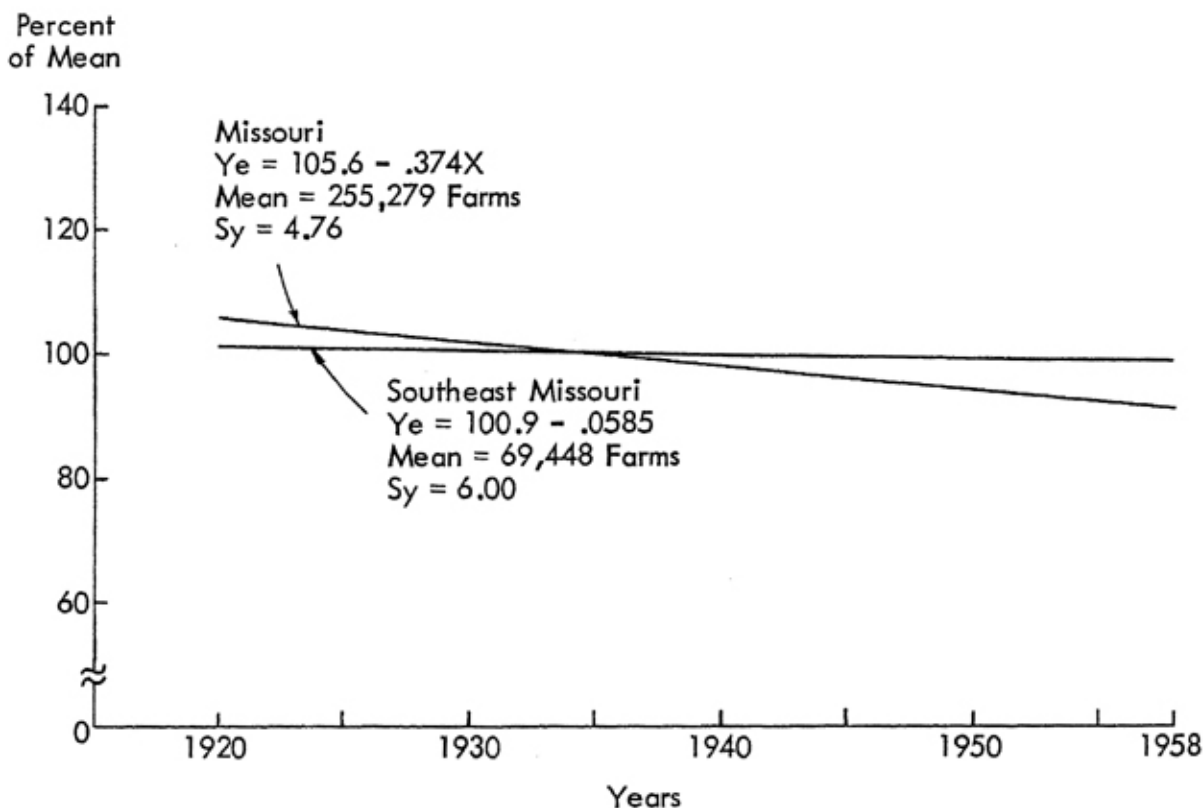
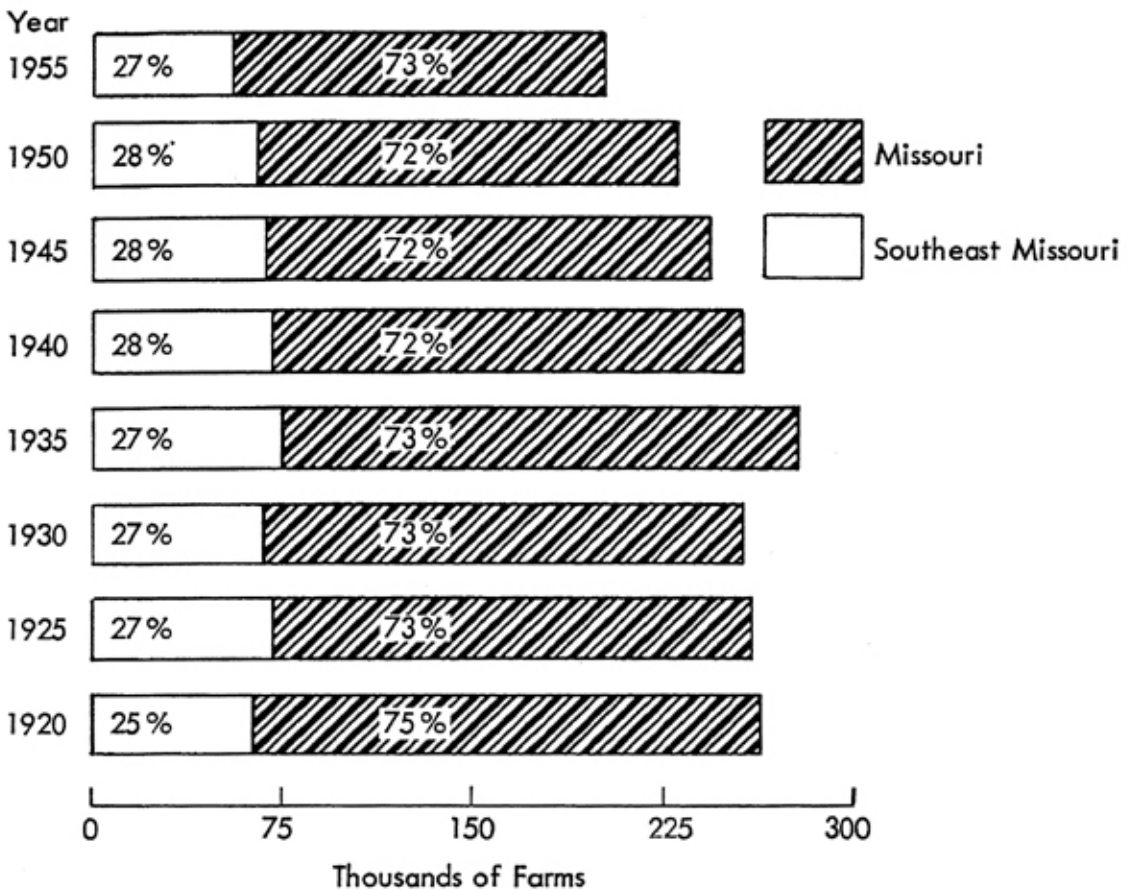


FIGURE 6
NUMBER OF FARMS

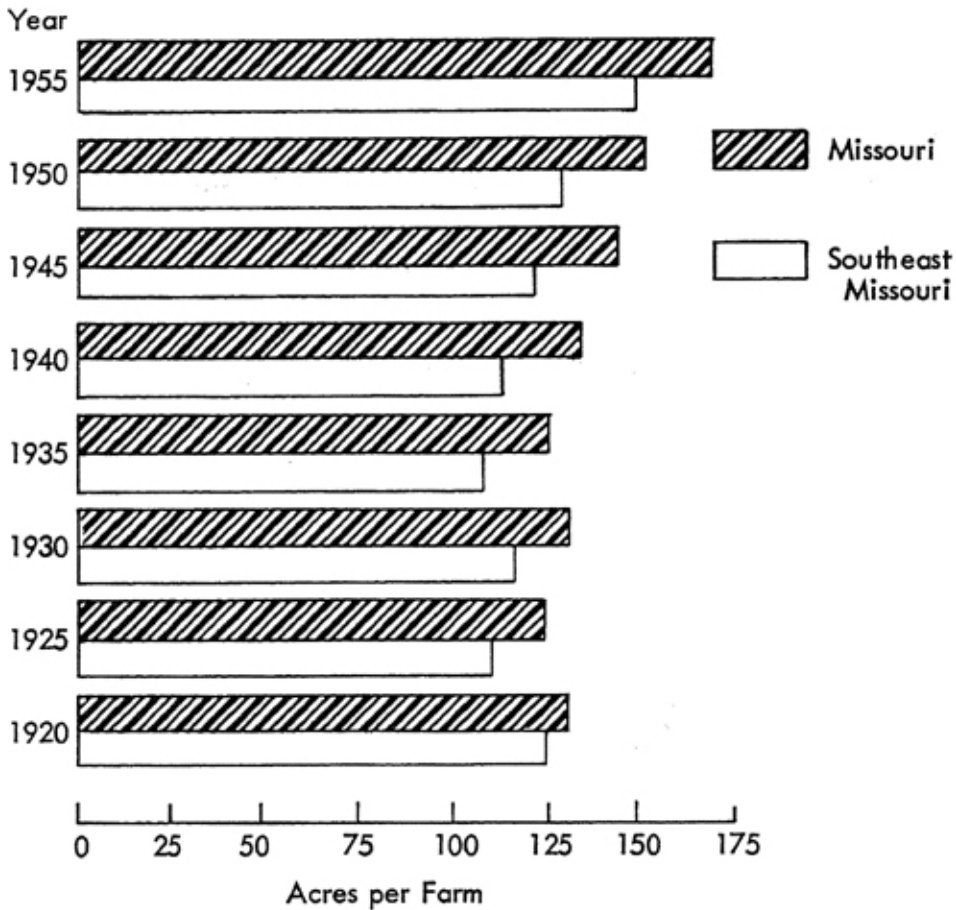


Although the average size of farms has been increasing in both the state and the area as a corollary to the decreasing number of farms, the increase has been more marked in the state as a whole than in the Southeast area during the period 1920-1954 (Figure 7). The size of farms in the area has varied in much the same manner as in the state, but the average size in the state as a whole has been larger than in the area. In 1920, the average size of farm for the state was 5.9 acres larger than the average for the Southeast area. This difference increased during each five year period to 1950, when it amounted to 22.9 acres. In 1954 the difference was 17.5 acres.

Due to differences found in various parts of the area, it is difficult to state reasons for the failure of farm size to change as rapidly there as in the entire state. Within the area included in this study is the largest city in Missouri, some of the most fertile land in the state, and some of the lowest in fertility.

The average size of farms near St. Louis has actually decreased since 1920. General farms along the Missouri and Mississippi Rivers have increased con-

FIGURE 7
AVERAGE SIZE OF FARMS



siderably in size and those in the Bootheel area and the Ozark region have remained about constant.

The value of farms around St. Louis reflects the alternative of sites for suburban homes and industrial development.³ Thus truck farming and dairying have become important on this land because of the relatively small amounts of land required in relation to the returns from such enterprises.

Average size of farms has increased in the generalized farming area along the Missouri and Mississippi Rivers. The land is flat to rolling and its value more nearly reflects the return from agricultural uses.

Because of the enforcement of acreage controls and the high cost of land in the Southeast low lands, the farmers have tended to use their land more intensively rather than add more acres to their holdings. Low incomes also contribute to the stability of farm size in the Ozark area. Many families have not been able to save enough or to establish and use a credit rating to enable them to buy more land.⁴

Marketing System—Farm to Plant. With new and better roads, new and faster means of transportation, and better methods of communication, the competition for milk has increased. Milk now can be cooled at the farm, picked up, and transported several miles to processing plants by insulated trucks in a few hours. This permits many buyers to compete for milk. In most cases, the milk producer continuously evaluates the various outlets for his product, searching for the buyer who will pay him the highest net price for his milk. The recent advent of bulk tank pickups in the industry has further increased the distance possible to transport milk. Because of these facts, several firms making a wide variety of products and located in a variety of places may compete for the milk that is produced in a given area.

There were 88 dairy plants receiving milk from producers in Southeast Missouri in 1954. Many of them supply the local trade only. Each of these plants competes with others for raw milk. If a plant manager has a market for his product that makes it possible for him to pay a significantly higher price than can be offered by others, his plant will be able to secure a greater volume of raw material.

In many cases competition for milk is more nearly typified by the competition between haulers than between plants. Often a producer may have the opportunity to sell his milk to as many as three or four plants because of the overlapping of routes. Prices paid by competing plants tend to be similar. Often the producer decides to which plant he will sell on the basis of the bargaining power of the haulers.

There has been a tendency for the number of routes per plant to decrease in Southeast Missouri (Table 2). Several factors have contributed to this decrease. Probably the most important is the use of larger trucks. Also contributing to this decrease is the advent of bulk tank pickups.

TABLE 2. AVERAGE NUMBER OF ROUTES, NUMBER OF PATRONS PER ROUTE, AND LENGTH OF MILK ROUTES, SOUTHEAST MISSOURI.

	1945	1950	1952	1954
Average Number of Routes per Plant	5.2	4.7	4.4	4.2
Average Number of Patrons per Route	28	23	19	18
Average Length of Route, Miles	82.6	77.5	86.7	80.6

During the period 1945-1954, the average number of patrons per route declined from 27.8 to 18.5. This probably is the result of an increase in production per farm and a reduction in the number of small herds.

The average length of routes shown in the table represents the average distance traveled by milk haulers in picking up milk each day. Thus the radius of the average procurement area for the plants in Southeast Missouri would be slightly less than half of these figures or approximately 35 miles.

Twenty-eight plants reported that they had an average of 7 producers de-

livering direct in 1945; 33 plants reported an average of 13.2 producers delivering directly to the plant in 1954.

A plant cannot put quality products on the market unless quality milk is delivered to it. Therefore, the method of transporting milk from producer to processor plays an important role. In Southeast Missouri, the closed and insulated truck body is replacing the open bed truck (Table 3). In 1954 there were five

TABLE 3. MILK COLLECTION TRUCK BODIES USED, SOUTHEAST MISSOURI.

Type of Truck Body	Year			
	1945	1950	1952	1954
	(Percentage)			
Open	28.5	31.0	21.5	18.5
Closed and Not Insulated	23.6	19.0	25.5	19.9
Closed and Insulated	47.9	50.0	53.0	59.3
Tank Trucks	0	0	0	2.3
Total	100.0	100.0	100.0	100.0

tank trucks in use in Southeast Missouri. By 1955 the number had increased to 11 and one plant had 100 percent bulk delivery. Plants handling market milk have encouraged the use of insulated truck bodies, but these bodies are relatively expensive, thus increasing procurement costs.

Table 4 presents data obtained from four butter plants that received cream only. Much of the cream received by these plants is not collected by route; it is

TABLE 4. AVERAGE NUMBER OF CREAM ROUTES, NUMBER OF PATRONS, AND LENGTH OF ROUTES, SOUTHEAST MISSOURI.

	1945	1950	1952	1954
Average Number of Routes per Plant	5.8	6.0	4.2	5.5
Average Number of Patrons per Route	43	38	59	50
Average Number of Patrons per Plant	247	227	252	273
Average Length of Routes	42.6	43.8	85.9	81.4

shipped in by rail or transport trucks. Sometimes it is received directly from producers. In other cases it has been received previously at other plants. The cream is picked up from the producer twice a week in most cases. However, one plant indicated that one of its routes picked up cream every other day. The number of patrons per route is about double the average number per milk route.

The length of cream routes in Southeast Missouri has increased. Much of this increase may be the result of shifts in the type of dairy production. As transportation methods improved and as it became profitable to intensify the dairy enterprise on many farms, the area used for the production of cream was pushed further away from the processing plants.

Both the number of producers and the pounds of cream sold have been decreasing. There were only 6,655 cream producers in Southeast Missouri in 1954 compared to 18,101 in 1944. In 1954 these producers sold an average of 464

pounds of butterfat per farm, compared to 370 pounds in 1944.

Closed, non-insulated truck beds are the main type of equipment used for transporting cream from producers to plants (Table 5). This is a rather drastic change from 1920, when 60 percent of the trucks were open bed style.

TABLE 5. CREAM COLLECTION TRUCK BODIES USED, SOUTHEAST MISSOURI.

Type of Truck Body	Year			
	1945	1950	1952	1954
	(Percentage)			
Open	60.0	33.3	16.7	0
Closed and Not Insulated	0	33.3	50.0	80.0
Closed and Insulated	40.0	33.4	33.3	20.0
Total	100.0	100.0	100.0	100.0

Competing and Complementary Farm Enterprises

Cash crops have been the major type of farm enterprise in the lowlands of Southeast Missouri for many years. Livestock and timber have been important sources of farm income in the uplands.

Corn. Corn acreage has been decreasing in the Southeast area and in Missouri (Figure 8). In 1920, corn was grown on 1,328,000 acres in Southeast Missouri (Figure 9). This was 20 percent of the state acreage. In 1956, corn was grown on only 728,000 acres but the percent of the state total was about the same.

FIGURE 8
TREND IN CORN ACREAGE

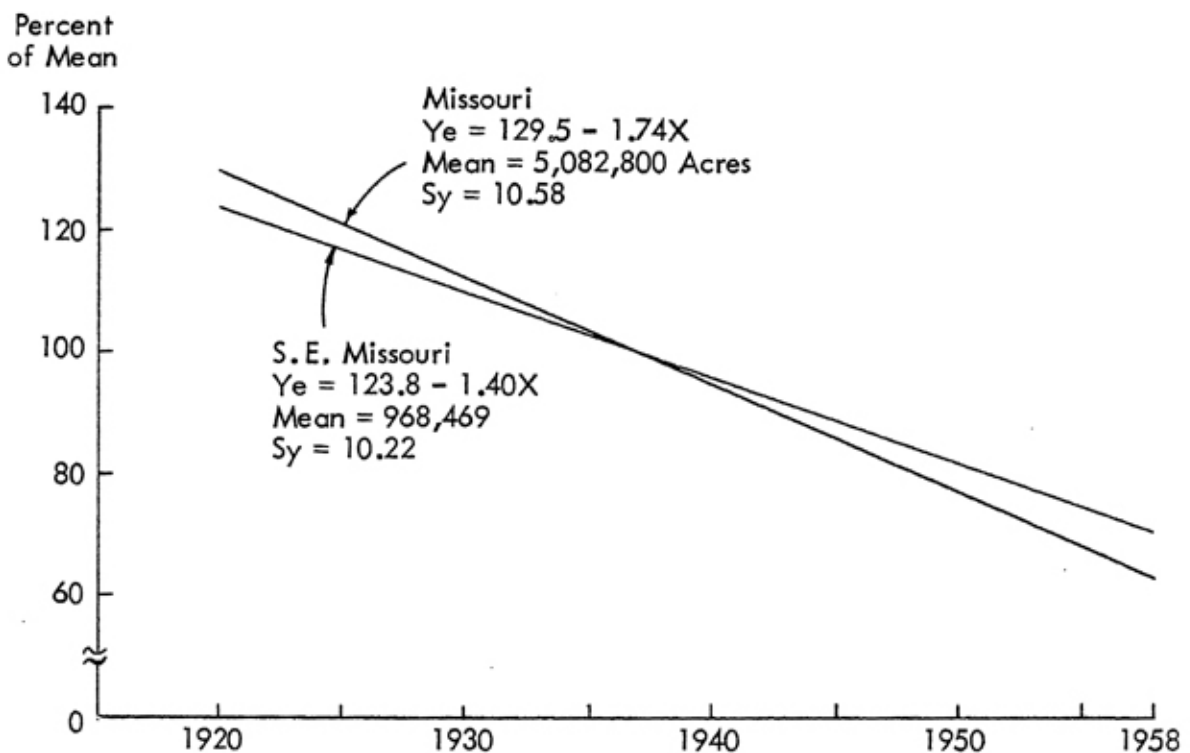


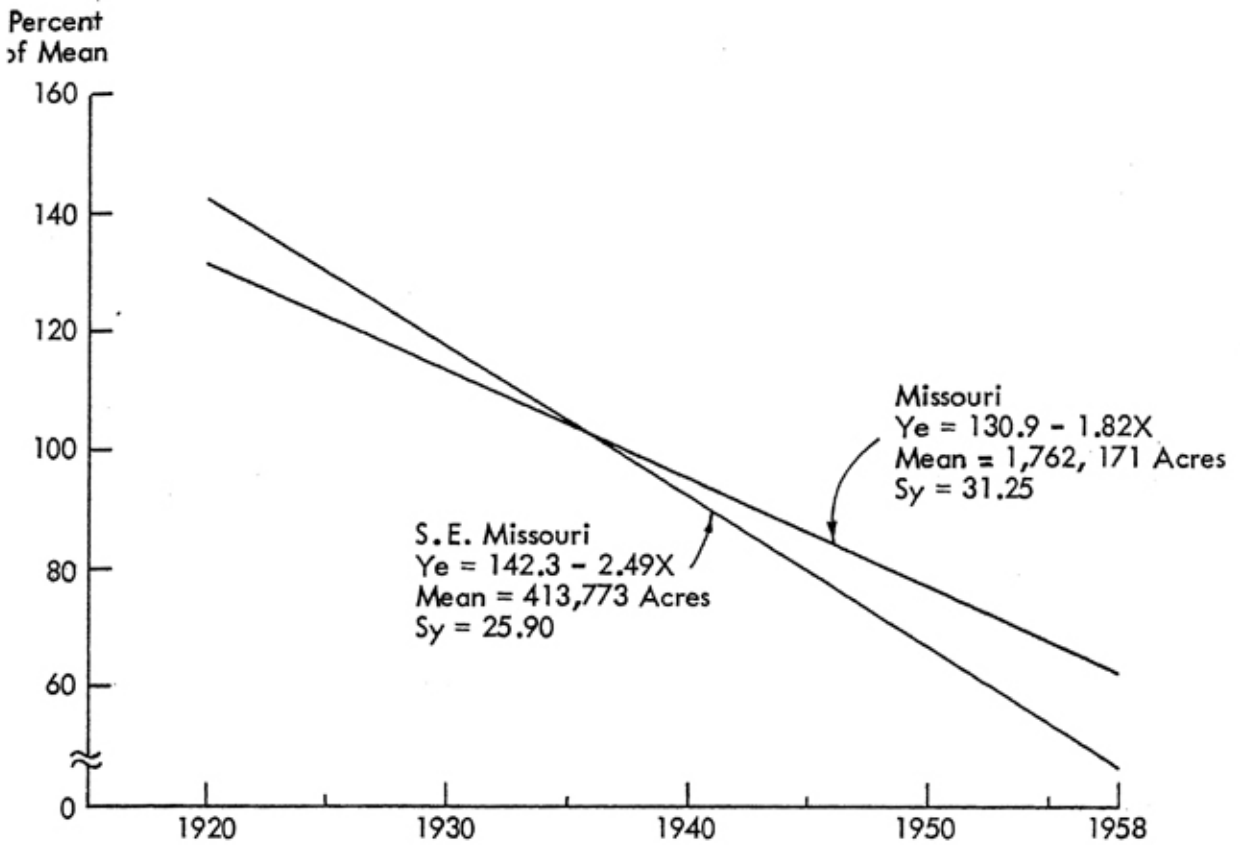
FIGURE 9
CORN ACREAGE



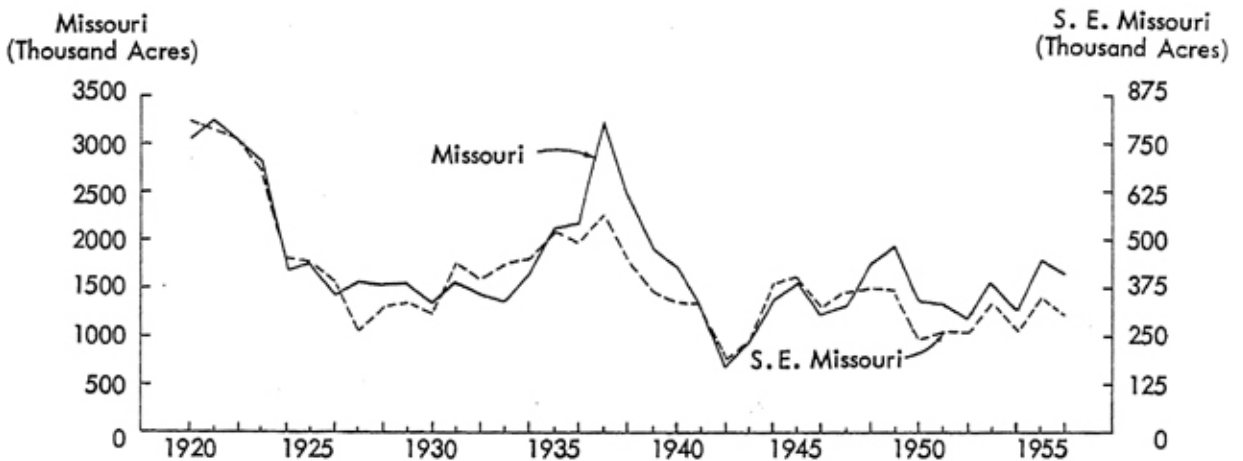
The largest decline, both in the area and in the state, was during the years 1933-1935. This perhaps can be explained by the drouth. Corn acreage never regained its level of the 1920s and has been relatively stable in the past 17 years. Corn acreage for the Southeast area in 1956 was 55 percent of 1920. Improved seed and widespread use of fertilizer have offset part of the reduction in acreage, so total corn production has declined less rapidly.

Wheat. Like corn, wheat acreage has been decreasing in both the Southeast area and the state (Figure 10). From 1920 to 1954, Missouri wheat acreage declined 58 percent. It has fluctuated quite widely (Figure 11). The large area decrease may have been due partly to the advent of soybeans as a cash crop in this area. The state and the Southeast area reached a 20 year low in 1942. Annual fluctuations in the area have resembled those in the state.

**FIGURE 10
TREND IN WHEAT ACREAGE**



**FIGURE 11
WHEAT ACREAGE**



Tame Hay. The acreage devoted to tame hay has fluctuated considerably (Figure 12), but the trend has been about level both in the state and in the Southeast (Figure 13).

FIGURE 12
ACREAGE OF TAME HAY

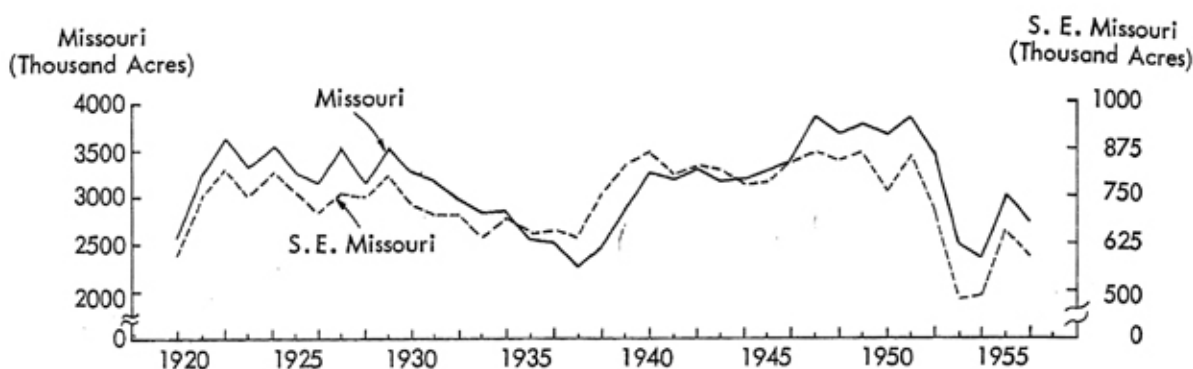
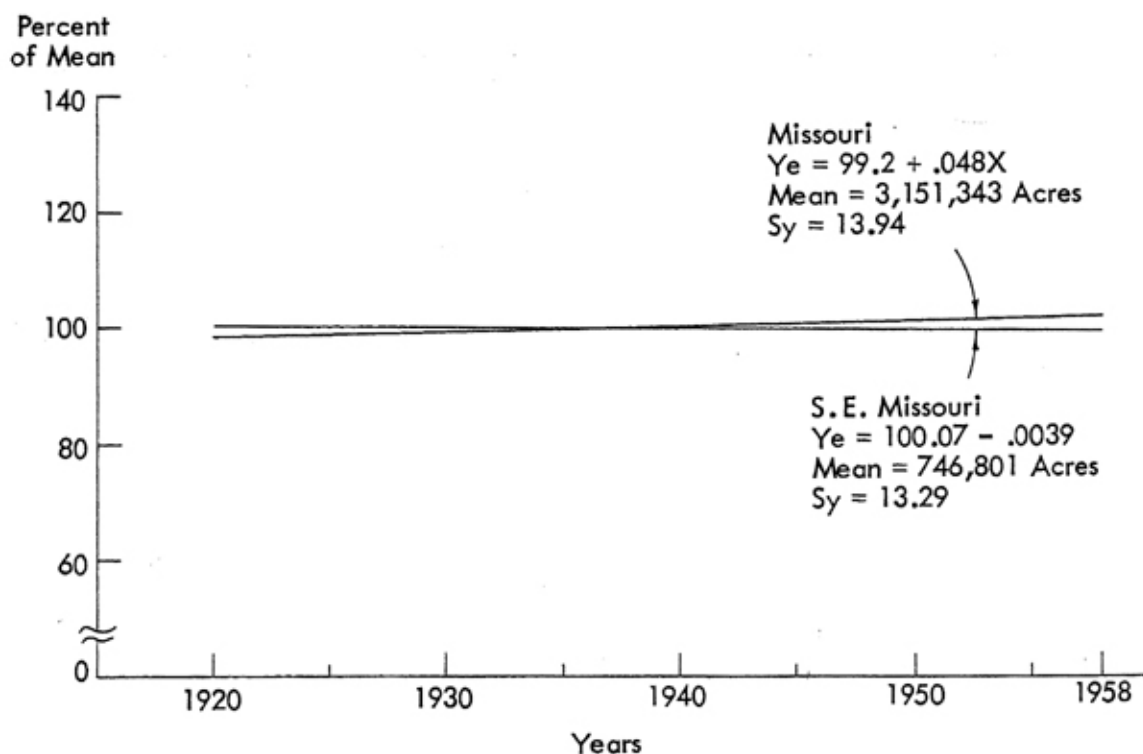


FIGURE 13
TREND IN ACREAGE OF TAME HAY



Soybeans. The area trend in soybean acreage has been upward at a rapid rate (Figure 14). A total of 70,700 acres of land was used for soybean production in 1941. By 1954 this had increased to 653,900, over 9 times the 1941 acreage (Figure 15). Before 1941, wheat and cotton were rotated, making a good combination of two cash crops. During the early war years, it was discovered that oil from soybeans could be used in the manufacture of many synthetic materials, thus causing soybeans to become more valuable as a cash grain crop. New varieties were developed that were suitable for growth in the area, and farmers began replacing wheat acreage with soybeans.

FIGURE 14
TREND IN SOYBEAN ACREAGE

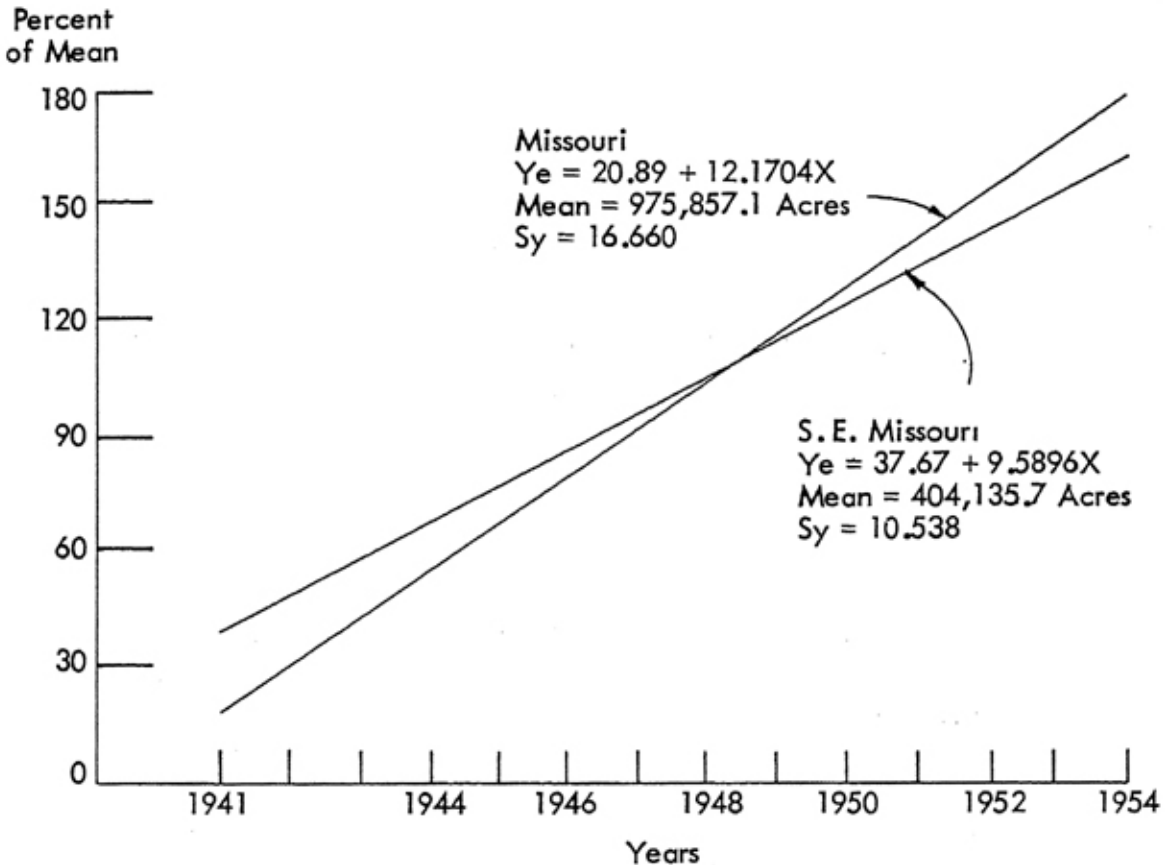
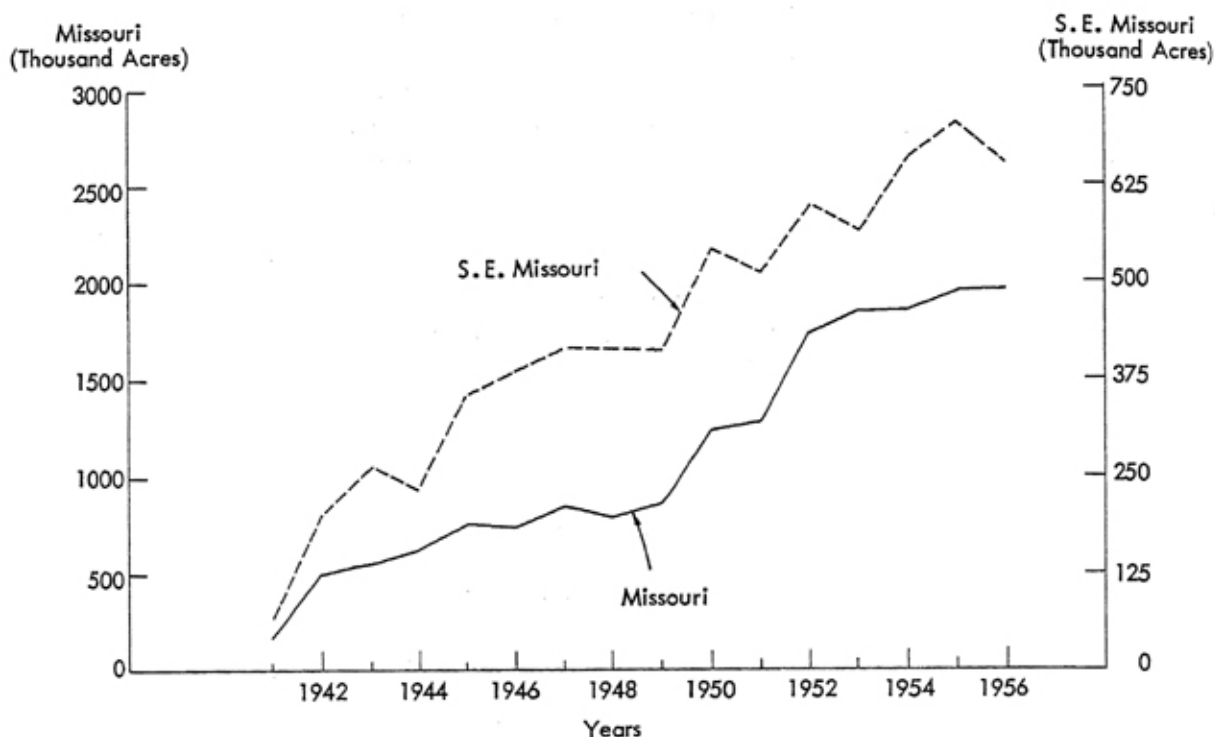


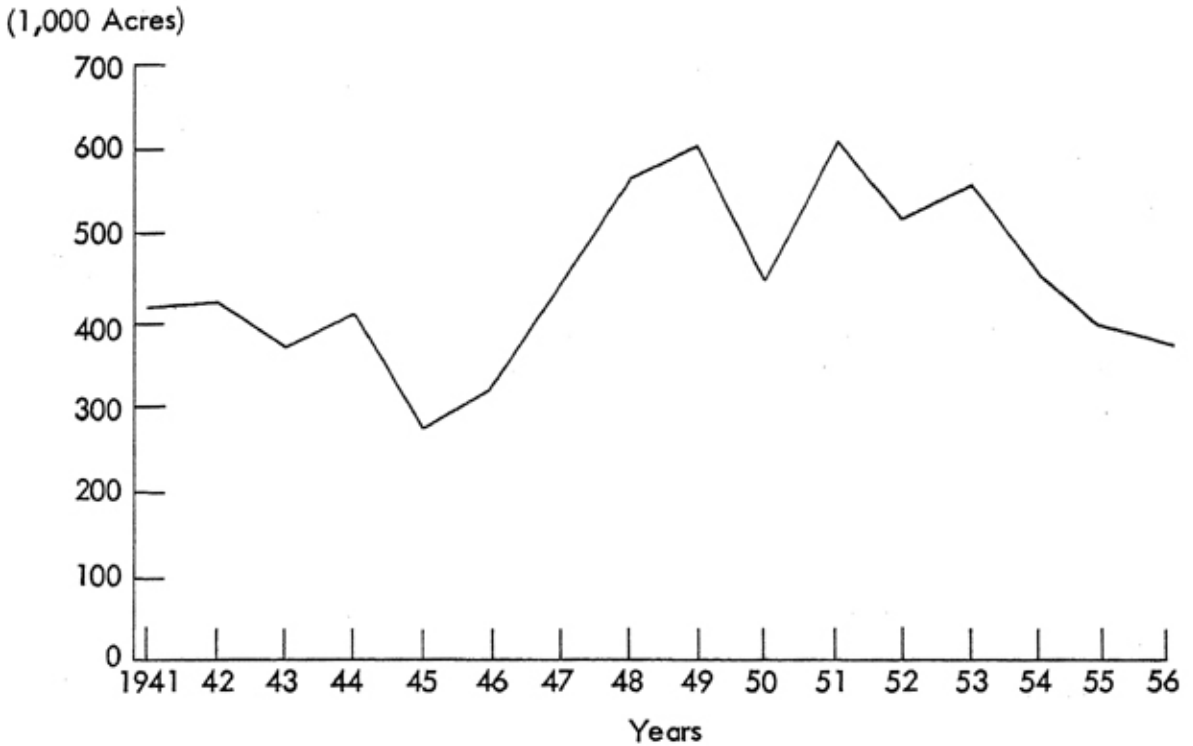
FIGURE 15
SOYBEAN ACREAGE



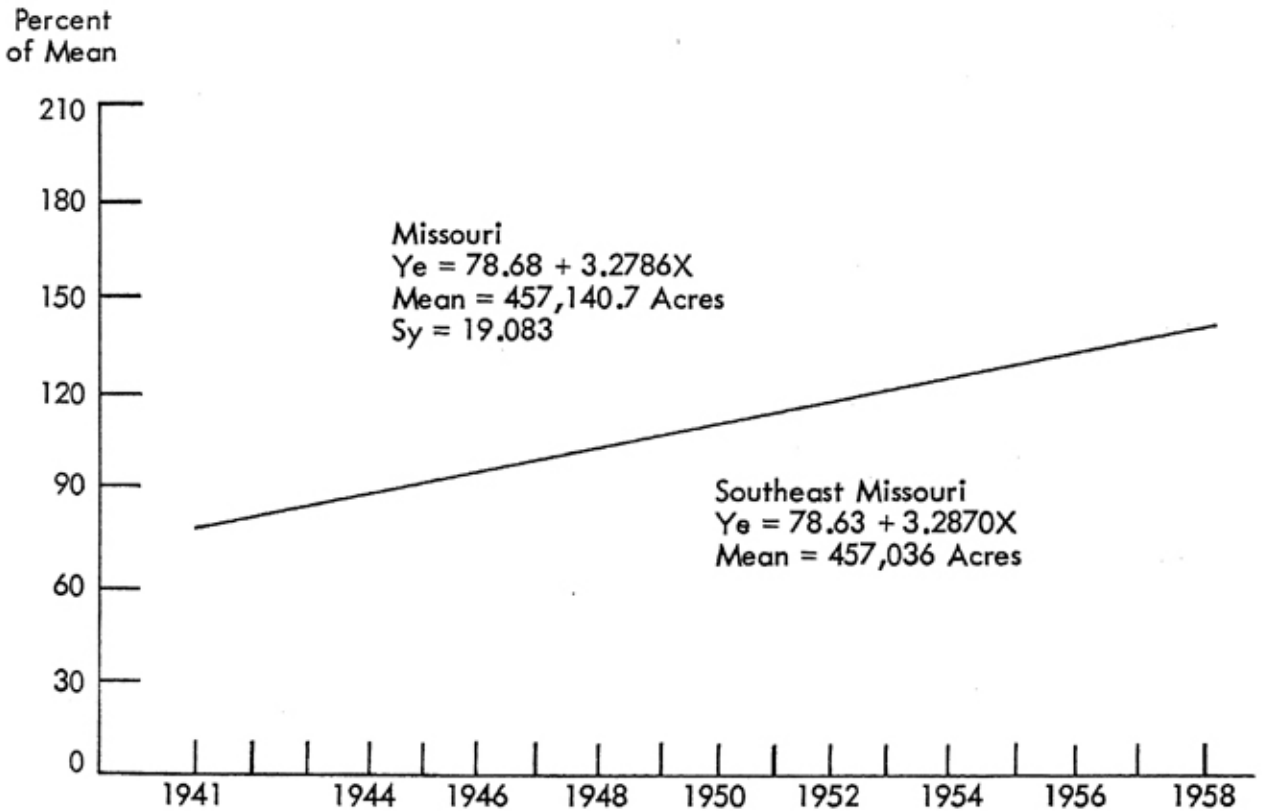
Note: Soybean production in this area averages more than one-third of the state total. Approximately one-fourth of the land area of the state is included in this area so the scales are set on that basis.

Cotton. For many years, the major cash crop in the Southeast Missouri delta area has been cotton. This area produces practically all the cotton grown in Missouri. Weather conditions, soil types, and the length of the growing season are such that cotton can be produced advantageously. Small amounts of cotton are grown in Howell, Ozark, Taney, and Vernon counties located outside the Southeast area but their production is less than 2 percent of the state's total. Cotton acreage has varied considerably from 1941 to 1956 (Figure 16.). Overall, the acreage has been increasing (Figure 17).

**FIGURE 16
COTTON ACREAGE**



**FIGURE 17
TREND IN COTTON ACREAGE**



Beef Cattle. Beef cattle numbers have been increasing at a more rapid rate than milk cow numbers but these data include replacement heifers and calves. Beef cattle provide the major competition for dairy cows among the livestock enterprises.

The rate of increase in beef cattle numbers in Southeast Missouri has exceeded that for the state by a slight amount (Figure 18). In 1958 there were 569,000 cattle other than milk cows in the area (Figure 19). This was a 45 percent increase over 1920. The number of beef cattle increased more rapidly than the number of milk cows; by 1958, the beef cattle comprised 79 percent of all cattle found in the area, compared to 69 percent in 1920. For the state as a whole, beef cattle were 78 percent of the total in 1958, compared to 71 percent in 1920.

Hogs. The hog population varied considerably both in the state and in the area from 1920 to 1958 (Figure 20). The number of hogs in the area more than doubled from 1935 to 1944. The increase for the state was even larger, being 129 percent for the same period. The Southeast area contributes a relatively small amount to the total hog population of the state. In 1920, the hogs in the area comprised 17.8 percent of the state's total. This ratio was almost the same in 1954, but in the later 1930s it increased to a little over 20 percent and remained there during the 1940s.

Some increase has been noted in the number of hogs kept in the counties along the Missouri River. They fit into the general farming enterprises which are typical there. However, most of the hogs in the area are stockers and, since they require only small quantities of corn, many of them are found in the Ozarks area.

**FIGURE 18
TREND IN BEEF CATTLE NUMBERS**

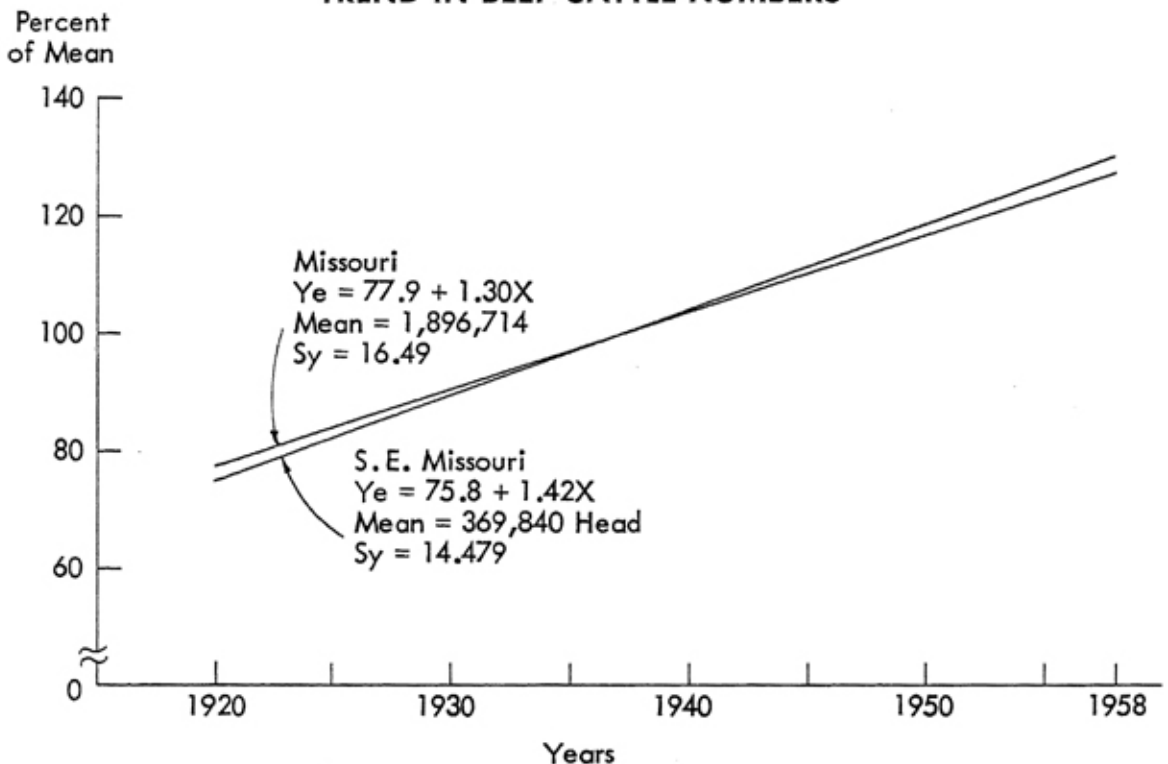


FIGURE 19
NUMBER OF BEEF CATTLE

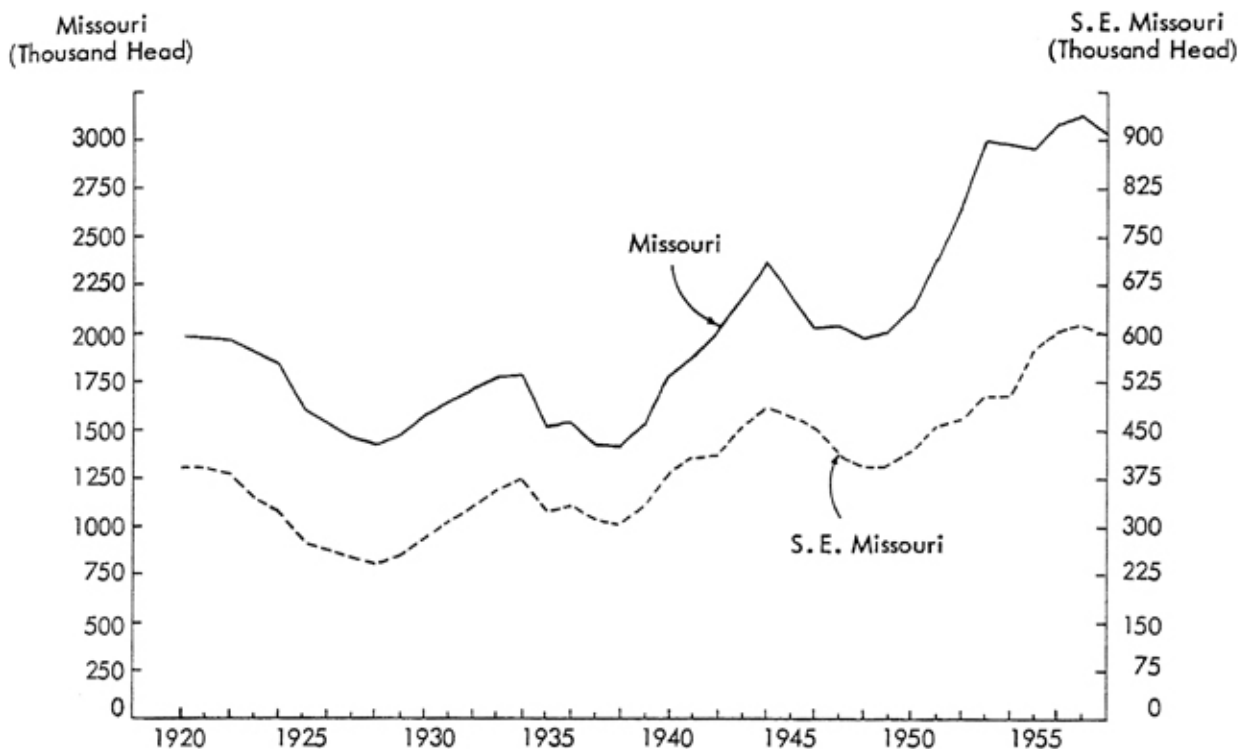
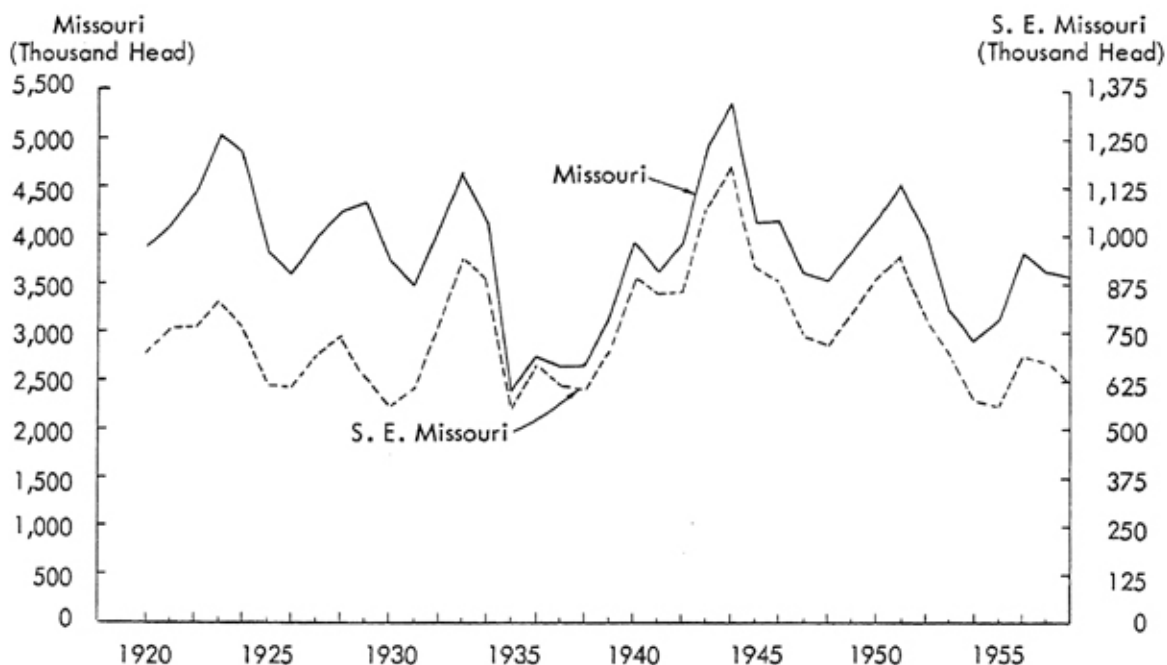


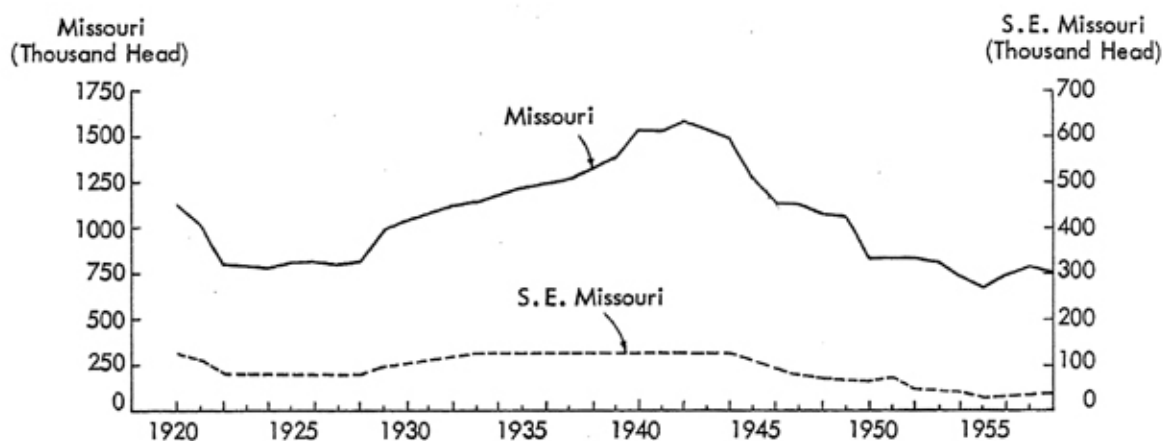
FIGURE 20
NUMBER OF HOGS



Sheep. The number of sheep in Southeast Missouri has varied but the general trend has been downward (Figure 21). The number increased from 75,000 in 1924 to 130,000 in 1942. From 1942-1958 the number declined from 130,000 to 36,000, a decrease of 72 percent.

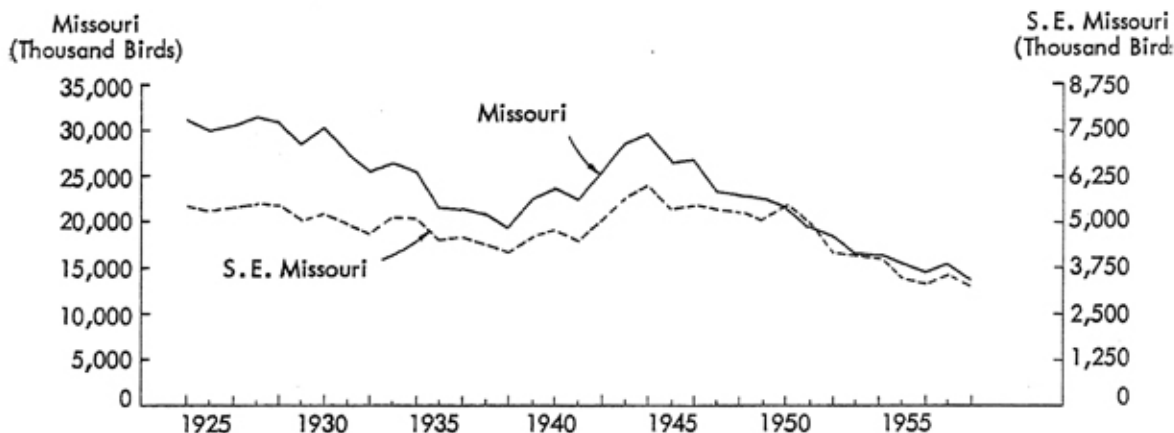
Sheep are becoming less important in Southeast Missouri. The major competing enterprise is beef cattle. Within the Ozark region are large areas of free range, which are better adapted to beef cattle than to sheep. Sheep require larger inputs of labor and good quality roughage for feed. Good quality roughage can be grown in the area, but most of it is used for dairy which has a comparative advantage in the use of this feed. Another problem in the free range area is dogs which kill many sheep.

FIGURE 21
NUMBER OF SHEEP



Chickens. There has been a downward trend in the number of chickens (excluding broilers) for both the state and the area from 1924 to 1958 (Figure 22). Throughout the period, about one-fifth of the chickens in the state were on Southeast Missouri farms.

FIGURE 22
NUMBER OF CHICKENS



RELATION TO THE INDUSTRY OF THE STATE

As the metropolitan centers within the area developed, the market for milk products increased. Dairying became a specialized occupation from which many farmers realized a sizeable contribution to their incomes.

The potentialities of a farm operation built around a dairy enterprise was first realized by farmers near St. Louis, Cape Girardeau, and Jefferson City. In 1920, the farmers in the area around these population centers contributed 79 percent of all the milk sold in the area, compared to only 48 percent in 1950. Many of these early farmers not only produced milk but integrated their operations until they performed all the functions of distribution and selling. At present there are only four producer-distributors in the Southeast area. There is still a concentration of dairying around the urban centers, even though large quantities of milk are produced in counties where there are no large markets and the milk must be transported many miles to an outlet.

In 1954, Southeast farmers produced approximately 16 percent of the milk produced in Missouri compared to 20 percent in 1944.

Milk Cows

Dairying in Southeast Missouri has been rather minor relative to other areas in the state and to other enterprises in the area. The land is adapted to the growth of two cash crops, cotton and soybeans. This has been a big factor in restricting the growth of the dairy industry of Southeast Missouri. The sub-areas with the largest number of cows extend along the Missouri and Mississippi Rivers, around St. Louis, and along the western border where much of the milk is shipped to Springfield.

Despite the comparative advantage for cotton and soybeans in the lowland area, and the suitability of the uplands for raising stock cattle, the number of milk cows has been increasing. The rate of increase, however, has been somewhat slower in the area than in the state (Figure 23).

The number of milk cows in both the Southeast area and the state has shown considerable variation (Figure 24). The area is favorably located in relation to the metropolitan centers of St. Louis and Cape Girardeau. Because of the rapid growth of these cities, the industry would be expected to expand in this area. Figure 25 shows the concentration of milk cows within the Southeast area and the relationship of dairy income to total farm income.

Most of the milk cows are found relatively close to large consuming centers or where superior transportation facilities are available. The counties near St. Louis and Cape Girardeau are heavily populated with cattle and a concentration is found along the western border and in the northwest portion of the area. In these sections there are several relatively large cities which have from two to three milk plants.

Much of the milk in the western part of the area is taken to receiving sta-

FIGURE 23
TREND IN MILK COW NUMBERS

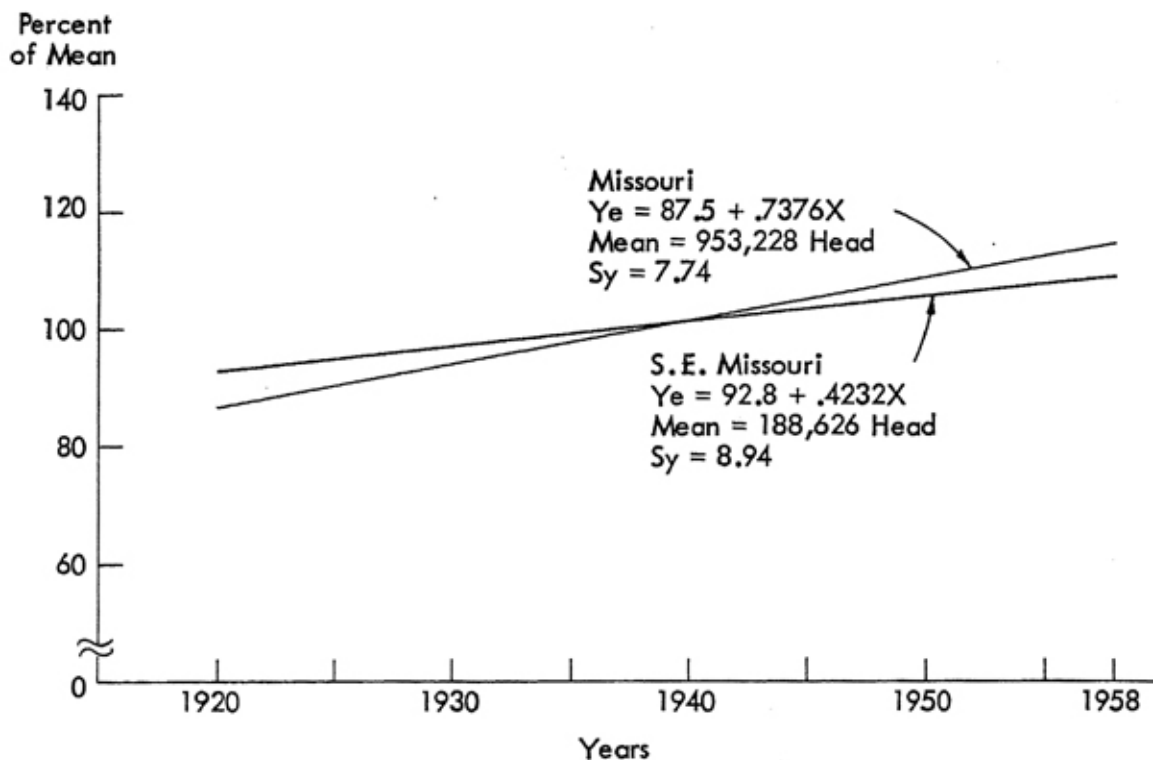
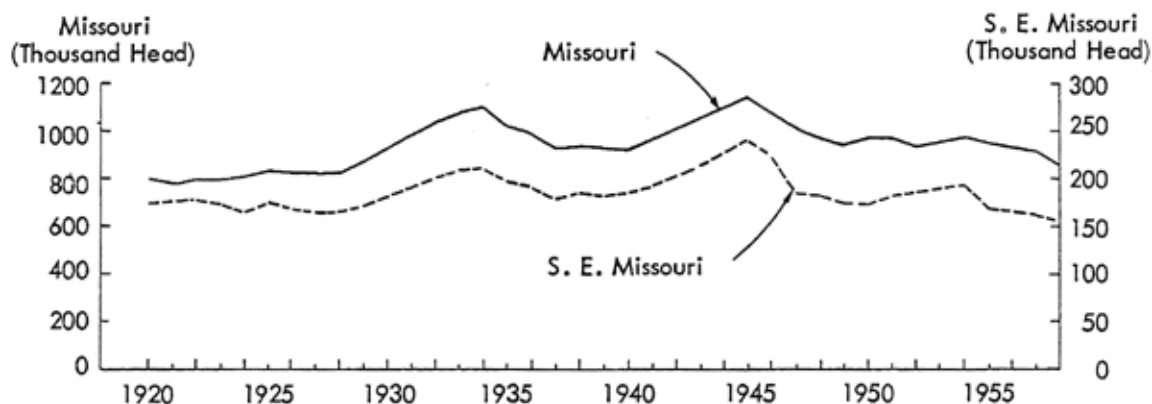


FIGURE 24
NUMBER OF MILK COWS



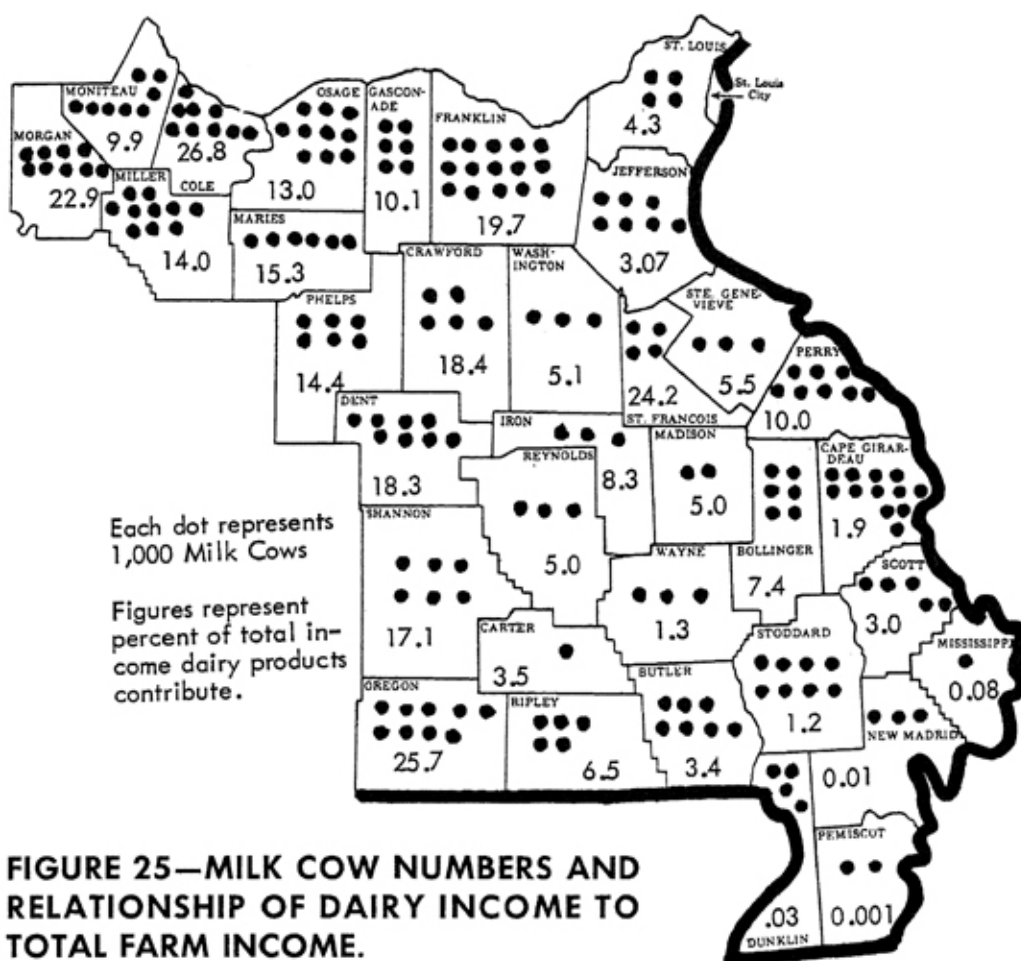


FIGURE 25—MILK COW NUMBERS AND RELATIONSHIP OF DAIRY INCOME TO TOTAL FARM INCOME.

tions where it is weighed and tested before being transported to Springfield by tank truck to be manufactured.

Dairy income is a very small percentage of total farm income in the cash crop area of the Bootheel. These counties have the largest farm income in the area but dairy income is low.

The highest percentages of income from dairying are found around St. Louis, along the Missouri and Mississippi Rivers, and along the western border.

The number of milk cows has not increased as rapidly in the area as in other sections of the state. Apparently the alternative of producing other farm commodities is more attractive. Many of the dairy firms, especially in the St. Louis market, have been forced to obtain supplies from places at a greater distance which lack such attractive alternatives to milk production.

The number of cows both in the state and in the area was relatively high during the depression years. This increase in milk cow numbers reflects the more favorable economic position prevailing then for dairying, compared to other farm enterprises. Also, since dairy prices do not fluctuate as much as other

farm prices and dairying yields a regular income, even though small, selling milk and cream became an attractive operation during those depression years.

The decline in number of cows in the area and the state from 1934 to 1937 can be explained partly by the relatively poor milk-feed ratio. The amount of concentrate which could be bought with each pound of milk reached an all-time low in 1934 of 1.09, a drop of 0.12 from the previous year and a drop of 0.25 from 1931. This relationship remained unfavorable to the dairy industry until 1938. It should be recognized that this was an era of rising prices. Due to the stickiness of milk prices, the price of feed advanced more rapidly than that of milk.

There was a general increase in milk cow numbers from 1940 to 1945, when an all-time high was reached in both the state and the area. There was an increase of 24 percent over the 1940 figure for the state and 29 percent for the area. This increase in the number of milk cows was preceded by a gradual increase in the milk-feed ratio. It also should be noted that this period represents World War II and part of this increase in cow numbers may be explained by the increased demand for dairy products and by the war effort to increase production. More influence was exerted on this area than on the rest of the state because of its proximity to St. Louis. The shortage of gasoline and tires made it imperative that milk be produced as near the consumer as possible.

The percentage of the state's milk cows located in Southeast Missouri declined from 21.7 in 1920 to 18.5 in 1958.

Production per Cow

Data on production per cow are not available by counties but some measure is needed to compare the area with the state in production efficiency. The total quantity of milk produced in the 34 counties of the area in 1940 and 1945 was divided by the number of milk cows on farms to get production per cow. The 1950 and 1954 census reports the quantity of milk produced on the day preceding the enumeration and the number of cows milked on that date. The data for 1940 and 1945 are not directly comparable with figures from the 1950 and 1954 census but the relationship between the area and the state can be used (Table 6). Production per cow is lower in the area than in the state. In 1954

TABLE 6. MILK PRODUCTION PER COW.

Year	Percent Missouri Average Production per Cow Was Above the Southeast Production
1940	3.7
1945	2.5
1950	2.5
1954	2.4

18.8 percent of Missouri's cows were located in the area but only 13.6 percent of the Missouri dairy income was received by area dairymen. This may be due to the emphasis placed on cash crops instead of crops for feeding purposes.

Farm Income from Dairy Enterprises

During the 15 year period, 1939 to 1954, the percentage of total farm income derived from the sale of dairy products in the area decreased (Table 7). Dairy sales in the area counted for 17.7 percent of the state total in 1939. By 1954 this had decreased to 14.8 percent.

TABLE 7. RELATION OF DAIRY INCOME IN SOUTHEAST MISSOURI TO TOTAL FARM INCOME IN THAT AREA AND TO TOTAL DAIRY INCOME IN MISSOURI.

	Year			
	1939	1944	1949	1954
SOUTHEAST MISSOURI:				
All Farm Products Sold (dollars)	54,622,441	130,492,733	184,979,417	196,523,750
Income From Sale of Dairy Products (dollars)	4,307,644	9,898,300	12,116,067	12,475,017
Percentage of Income From Dairy Products	7.9	7.6	6.6	6.3
MISSOURI:				
All Farm Products Sold (dollars)	214,655,304	506,490,936	719,877,797	733,733,793
Income From Sale of Dairy Products (dollars)	24,367,273	65,469,604	79,246,261	84,202,959
Percentage of Income From Dairy Products	11.4	12.9	11.0	11.5
Dairy Income in Southeast Missouri as a Percent of State Total	17.7	15.1	15.3	14.8

*Census of Agriculture.

In addition to the sale of milk and cream, there are further returns from the sale of calves and cows culled from the dairy herd. Returns from these sources, appear in census reports as income from the sale of livestock and are not credited to the dairy herd. While it would be difficult to arrive at the exact source of this income, it is a matter of some importance.

The dairy cow contributes a substantial part of the farm income in Southeast Missouri, but the proportion contributed here is somewhat less than that in the state as a whole.

CHARACTERISTICS OF THE AREA MILK SUPPLY

Seasonality of Production

In the spring of the year when pasture is plentiful, cows produce more milk. Often, due to the lower cost of pasture feeding in relation to concentrate and hay, the producer establishes a policy of spring freshening. These two things cause more milk to be marketed in the spring.

This variability of production adds to the cost involved in the storage of products and provision of additional plant capacity. Each firm must have a plant large enough to handle the milk received during peak production months. The labor force must be carried at an under-employed rate during slack seasons or laid off, then rehired during the peak season. This problem is further complicated by the fact that trained labor is difficult to obtain, particularly on a seasonal basis. Figure 26 illustrates the seasonality of milk receipts in the area, Missouri, and the United States. In each case, the largest percentages of the yearly receipts are in the spring months of April, May and June, with relatively large proportions coming during the summer months.

Southeast Missouri has a more uniform production than the other areas illustrated. During April, May, and June, dairy plants in Southeast Missouri received 28.2 percent of total yearly receipts compared to 30.4 percent for the state as a whole. There are several factors that contribute to this difference. Probably the most important is the longer growing season in Southeast Missouri, which permits milk cows to graze on grass for a longer period of the year. Pricing policies are being used by some grade A markets to discourage increased production during the summer months when in many cases the market for bottled milk is depressed.

Butterfat Content

Butterfat content of milk produced in Southeast Missouri averaged 3.86 percent during 1955, the same as the United States during that year (Table 8). This was somewhat lower than the state average.

The percentage of butterfat in milk received by plants processing different products varied considerably in the Southeast area. In 1955, nine plants processing

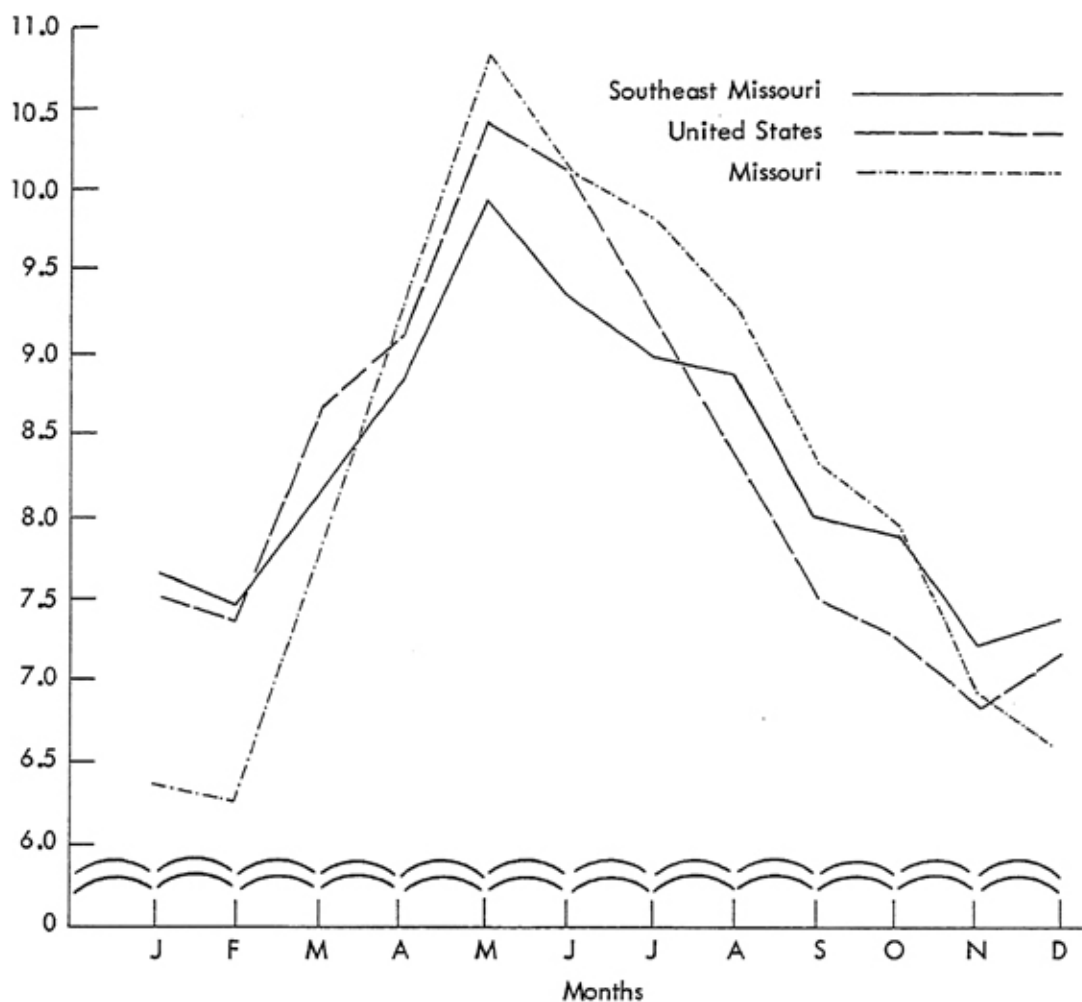
TABLE 8. AVERAGE ANNUAL BUTTERFAT TEST OF MILK SOUTHEAST MISSOURI, MISSOURI, SOUTH CENTRAL STATES AND THE UNITED STATES, 1955.

	Butterfat Test (percent)
Southeast Missouri*	3.86
Missouri**	4.15
South Central States**	4.28
United States**	3.86

*Simple average for the receipts of all plants in the area.

**United States Department of Agriculture, Farm Production, Disposition and Income from Milk.

FIGURE 26
PERCENT OF ANNUAL MILK PRODUCTION
RECEIVED PER MONTH; 1954.



cheese received milk with an average butterfat test of 4.18 percent while twenty-five ice cream manufacturing plants had an average butterfat test of 3.86 percent. The cream received by butter plants in Southeast Missouri tested, on the average, 36.5 percent.

Milk and Cream Prices

The producer's first consideration is the basic price quoted by the firm. However, hauling charges, personal relationships with the hauler and other firm representatives, butterfat differentials and services provided may modify his decision. Most dairy firms base their price on the amount of butterfat in the milk. This method became prominent with the development of the Babcock test for butterfat. Usually plants quote their milk price as so much per hundredweight for milk of a specified butterfat content, plus or minus a differential for each point the milk tests above or below the standard. However, some plants quote a price per pound of butterfat in the milk.

Many of the Southeast Missouri producers ship their milk to the St. Louis market, which is regulated by Federal Milk Market Order No. 3. The producer price for milk is based on the usage made of it by the dairy plants.

Many of the firms not regulated by the Federal Order use the blend price established in St. Louis as a guide in their pricing policy. Many do not alter the price at all while others may add to it or deduct to meet their specific needs.

Those plants which paid a premium over the St. Louis blend price were usually in need of a larger supply of raw milk to meet the demand for their product. More frequently, however, plants deducted from the St. Louis blend price. This deduction, in many cases, was made to equate the local price with that of the St. Louis market after hauling charges were paid. In some cases the supply of milk was large enough that the local plants did not have to meet outside prices to receive all the milk they needed.

Plants located some distance from St. Louis usually paid lower prices while the highest prices were paid by those located near St. Louis but not regulated by the Federal Order. These plants paid this price in order to compete with larger plants in St. Louis for their supplies.

An unregulated plant can pay a higher price than those under regulation and still receive its bottling supplies at a lower price. This would be possible if the firm were using a larger portion of its receipts for Class I than the regulated plants. No plant consistently paid the lowest price, nor did any particular plant consistently pay the highest price.

Manufacturing milk prices in the area are reported in Table 9.

Table 10 gives the prices paid for butterfat in cream during selected months in 1952 and 1954. The relationship between the variability of cream prices and the seasonality of cream production is not as great as with fluid milk. This may be partly the result of government intervention with support prices. Another factor is the storability of the butter produced.

TABLE 9. RANGE OF PRICES PAID FOR MANUFACTURING MILK, SOUTHEAST MISSOURI, TWELVE PLANTS SELECTED MONTHS, 1952-1954*

	February		April		June		October	
	1952	1954	1952	1954	1952	1954	1952	1954
	(Price per hundred weight)							
High	\$4.45	\$3.40	\$4.20	\$3.20	\$4.16	\$3.12	\$4.25	\$3.30
Low	3.88	3.08	3.60	2.76	3.52	2.68	3.68	2.80
Weighted Avg.	4.29	3.18	3.93	2.90	3.82	2.86	4.00	3.16
Average Missouri Price**	\$4.36	\$3.32	\$4.16	\$3.20	\$4.24	\$2.88	\$4.00	\$3.04

*Based on 4% milk.

**Missouri Farm Product Prices, Office of the Agricultural Statistician, Box 30, Columbia, Mo.

TABLE 10. RANGE OF PRICES PAID FOR CREAM, SOUTHEAST MISSOURI, SEVEN PLANTS, SELECTED MONTHS, 1952 and 1954.

	February		April		June		October	
	1952	1954	1952	1954	1952	1954	1952	1954
	(Cents per pound of butterfat)							
High	.85	.64	.78	.59	.69	.65	.70	.59
Low	.59	.52	.58	.40	.57	.47	.58	.50
Missouri Average Prices*	.79	.58	.70	.48	.64	.48	.67	.48

*Missouri Farm Product Prices, Office of the Agricultural Statistician, Box 30, Columbia, Mo.

Disposition of Milk

Milk produced on farms may be fed to livestock, consumed by the farm family, converted into farm butter and by-products that are fed or consumed, sold as cream or as wholesale milk, or bottled and delivered to consumers by the dairyman who keeps the cows.

From 1924 to 1934 the disposition of the state dairy production remained relatively constant (Figure 27). Since 1934, the manner in which milk has been disposed of has undergone major changes. Sales of butter and cream to dairy plants decreased from more than 50 percent of the total in 1934 to 14 percent in 1954. Sales of whole milk to plants have moved upward. Milk fed or consumed on farms has moved steadily downward from the high in 1920 of 39.6 percent to 16.1 percent in 1954.

The method of selling milk in Southeast Missouri changed considerably from 1939 to 1954 (Table 11). The trends in Southeast Missouri have been comparable to those in the state as a whole. There has been an upward trend both in the area and the state in the proportion of milk marketed in whole form. The Southeast has changed slower than the Southwest area or the state as a whole but a little faster than the Northwest area. The difference in the method of disposing of the milk from the farm in Southeast Missouri and the state as a whole may be due to the fact that the average size of dairy herds in the area was 5.9 cows, compared to 7.2 in the state. The averages were computed from the total number of dairy cows in the area and the state and the number of farms reporting dairy cows. Many farm operators reporting dairy cows keep only 1 or 2 to

supply the family with fresh milk, cream, and butter. During a portion of the year, the cow or cows produce more than is usable in the home. Surplus milk is skimmed and the cream is taken to the nearest market.

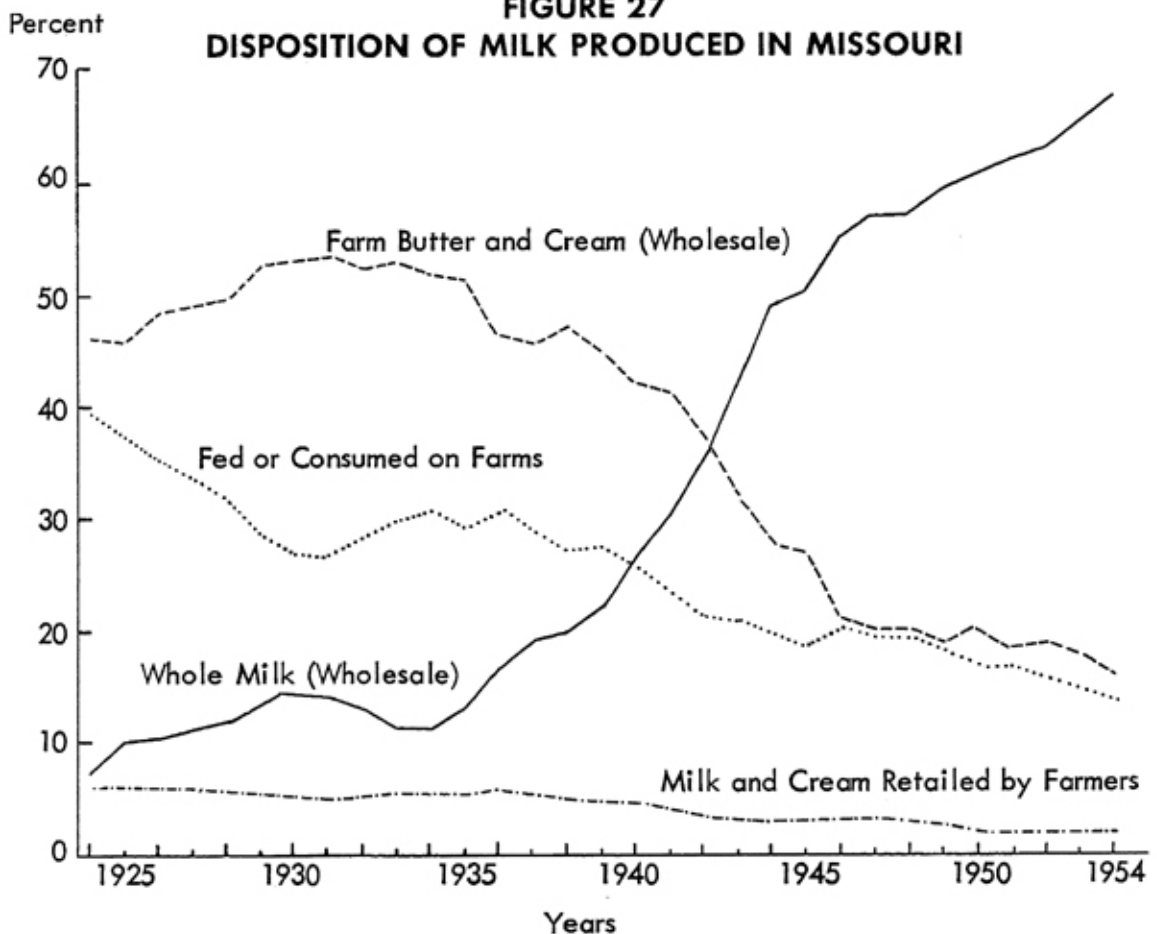
TABLE 11. MILK AND CREAM SALES IN SOUTHEAST MISSOURI AND MISSOURI, 1939, 1944, 1949, and 1954.*

	Year			
	1939	1944	1949	1954
SOUTHEAST:				
Sales of Whole Milk (1,000 pounds)	119,865	196,914	241,431	308,872
Sales of Cream, Butterfat (1,000 pounds)	6,498	6,696	5,016	3,090
Whole Milk as a Percent of Total Sales**	42.5	54.1	65.8	80.0
Cream as a Percent of Total Sales	57.5	45.9	34.2	20.0
MISSOURI:				
Sales of Whole Milk (1,000 pounds)	846,702	1,634,221	1,816,061	2,261,194
Sales of Cream, Butterfat (1,000 pounds)	37,771	31,061	25,193	16,135
Whole Milk as a Percent of Total Sales**	47.3	67.8	74.2	84.9
Cream as a Percent of Total Sales.	52.7	32.2	25.8	15.1

*United States Census of Agriculture.

**Cream Sales converted to milk on basis of 4 percent butterfat content, and added to whole milk sales to give total sales.

FIGURE 27
DISPOSITION OF MILK PRODUCED IN MISSOURI



MARKETS FOR FINISHED PRODUCTS

One of the purposes of this study was to determine the adequacy of outlets available for dairy production in the area. The production of a raw commodity is just the initial phase in a long line of functions necessary for final distribution of a product to consumers.

Much of the milk produced in the Southeast area is processed and consumed close to the point of production. A considerable volume, however, is transported to St. Louis to help satisfy the demand there.

To trace the movement of milk products from the Southeast area to the ultimate consumer is beyond the scope of this study. However, a short discussion of the general movement can be presented.

St. Louis is the principal market located within the area and much of the processed milk and manufactured products are retailed there. Some of the companies, however, send their products to other areas where they are distributed to consumers.

Butter

Fourteen plants in the area reported that they bought cream. However, only five of the 14 had facilities for manufacturing butter. The other nine indicated that they received cream but transferred it to one of the five with butter manufacturing facilities.

The distribution channels for the finished product were quite varied. Two plants reported substantial sales to the government. Most of their other sales outlets were located in St. Louis county. One plant, however, wholesaled part of its output in Danville, Ill. Approximately 50 percent of the butter they sold in St. Louis County was distributed by wholesalers and jobbers and the other 50 percent was sold direct to retailers.

Two of the other plants indicated that their entire output was consumed in St. Louis county. Another reported that it sent its entire output to Chicago.

Three of the five butter plants were located in St. Louis, while the two oldest plants, established in 1892 and 1895, were located in the Southern part of the area.

The demand for butter has declined drastically in the past few years but continues to provide an important outlet for Missouri milk production.

Cheese

Cheese, long an important product of the dairy industry in Missouri, is manufactured in nine Southeast Missouri plants. As the cheese industry has grown, the process of making a quality product has become complicated, requiring costly manufacturing facilities and experienced labor.

A relatively small proportion of natural cheese remains in the area as most of it is shipped out for further processing. Two plants process and sell about one million pounds of cheese in the area annually. This includes the entire output of one plant and one-fourth of the other. There are no blending plants in Southeast Missouri. Six plants shipped the processed raw curds to Springfield where blending operations were performed.

One large plant ships its entire production to Pennsylvania, where it is blended and distributed to consumers, while another wholesales all of its production to a meat packing firm.

Ice Cream

Twenty-nine plants reported that they manufactured ice cream. However, only 2 manufactured it exclusively. This illustrates the adaptability of ice cream production to the operations of diversified milk and milk products plants.

Ice cream manufacturing does not require large inputs of capital in expensive machinery. A good freezing unit is not very expensive and much of the regular milk bottling equipment, such as pasteurizer, and homogenizer, can be used in producing ice cream. An important reason for the wide-spread production of ice cream is to provide an outlet for milk in excess of bottling needs.

Since most firms agree to purchase whatever amount of milk a producer may send, as long as it meets quality requirements, there are often wide fluctuations in plant receipts. These variations may be more easily handled if the dairy firm is diversified to include ice cream manufacturing in its operations.

None of the ice cream produced in Southeast Missouri is transported out of the area except for small amounts to cities in bordering counties. The distribution channels are very similar to those for fluid milk.

The two plants in Southeast Missouri that manufacture only ice cream sell all of their production to retail distributors in surrounding towns.

Fluid Milk

Fifty-six plants bottled fluid milk and cream. Most of these also manufactured some other product. However, 15 reported that they processed only fluid milk and cream. Other dairy manufacturing operations fit in well with milk bottling. The amount of bottled milk sold does not vary to a great extent, over the course of a year, while the receipts of raw milk at the plant vary quite drastically. To coordinate operations and provide a market for all their intake, it is often necessary for a bottling plant to manufacture the milk they cannot dispose of in fluid form. The chief products manufactured are ice cream and cottage cheese.

Most of the fluid milk processed in the Southeast area is also distributed there. However, some plants in cities along the Mississippi River sell fluid milk in Illinois, and two or three plants located in St. Louis ship milk to Paducah Ky., for distribution.

The predominant method of disposing of bottled milk in Southeast Missouri is through retail stores.⁵ A considerable portion of the milk in the larger cities is still sold on house to house routes, although this method is not used as extensively now as it was a few years ago.

During the period 1940 to 1950, the population of St. Louis increased 15.7 percent. Accompanying the population growth was a significant increase in per capita income. In 1940 the per capita income was \$763 compared to \$1,738 in 1949. The increased income contributed to an increase in per capita consumption of fluid milk which rose from 0.43 pints daily in 1940 to 0.62 pints in 1946. This figure then declined to 0.58 pints in 1950. The combination of increasing per capita consumption and growing population resulted in greatly expanded sales of fluid milk.

Producers in Southeast Missouri have been increasing their sales of fluid milk to the St. Louis market. In 1950, 683 producers in Southeast Missouri delivered approximately six million pounds of milk to the St. Louis market. In 1955 the number of producers had increased to 757 and the amount of milk delivered to about eight million pounds. Even with this increase the sales accounted for a smaller part of total Missouri sales to the St. Louis market—45 percent in 1950 and 40 percent in 1955.

Other Products

Of the various other products produced in the area, cottage cheese probably is the most important. Fifteen firms reported facilities for manufacturing cottage cheese. However, some of these did not use their facilities regularly, manufacturing cottage cheese only when they had a surplus of milk. Cottage cheese, like ice cream, fits into the operations of milk bottling plants very well as a possible outlet for excess milk.

Cottage cheese, for the most part, is distributed the same as ice cream and fluid milk. However, most sales are through retail store outlets rather than route delivery.

Other products of some importance to the dairy industry of Southeast Missouri are condensed and evaporated skim milk and dry skim milk. When cream is separated from whole milk, the skim milk is then either condensed, evaporated, or dried and sold as non-fat milk solids. Most of these products were wholesaled in St. Louis where they were used in combination with other ingredients in the manufacture of various types of food.

EXISTING PLANTS

The processing plants in Southeast Missouri ranged from one room milk receiving and bottling plants to some which were equipped with the most modern equipment and processed enough milk to feed the entire population of several small cities. Some were processing the production of a single farm and distributing the products in a local village; others were receiving milk from many producers and shipping the products to various markets in the United States.

The location of the dairy plants in Southeast Missouri is shown in Figure 28. Twenty-eight were in St. Louis county. The others were fairly well distributed over the rest of the area although there were no plants in nine of the counties.

Managers were asked for an estimate of the maximum quantity of milk or cream which could be received and handled in an eight hour day, also the quantity of the various products which could be produced from this milk or cream.

Table 12 summarizes managers' estimates of the capacity of the 68 plants that received milk from producers. Forty percent were under 10,000 pounds daily

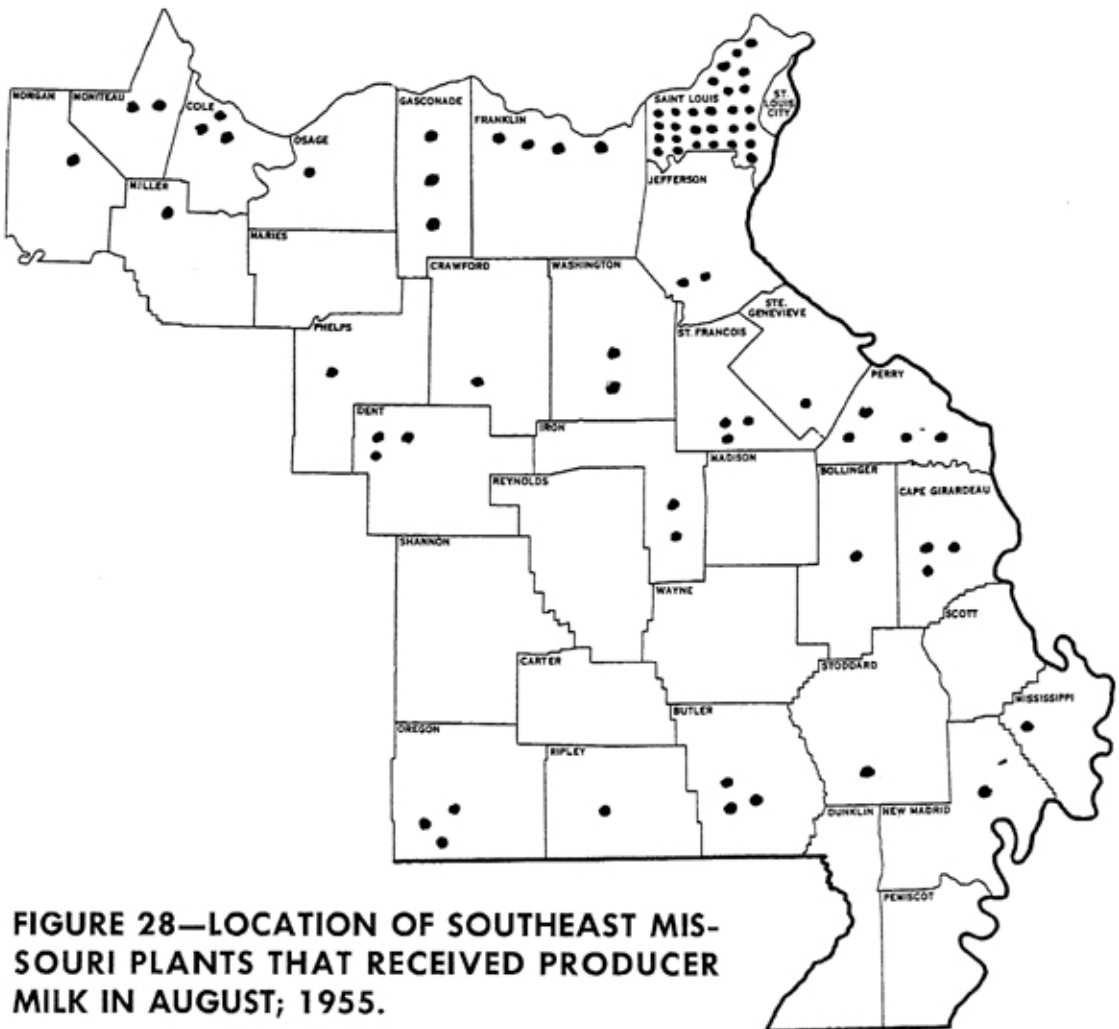


FIGURE 28—LOCATION OF SOUTHEAST MISSOURI PLANTS THAT RECEIVED PRODUCER MILK IN AUGUST, 1955.

TABLE 12. ESTIMATED SIZE* OF DAIRY PLANTS IN SOUTHEAST MISSOURI, AUGUST, 1955.

Pounds of Milk	Number of Plants
1 - 10,000	27
10,001 - 20,000	7
20,001 - 30,000	8
30,001 - 40,000	5
40,001 - 50,000	5
50,001 - 70,000**	5
70,001 - 100,000**	5
100,001 and over	6
Total	68

*Eight Hour Day Maximum Capacity.

**Class intervals combined to avoid possibility of revealing identity of plants.

capacity. Only six had a capacity of over 100,000 pounds per day.

The capacity of cream plants in the area is shown in Table 13. Most of them had a daily capacity of less than 5,000 pounds.

TABLE 13. ESTIMATED SIZE* OF DAIRY PLANTS RECEIVING CREAM, IN SOUTHEAST MISSOURI, AUGUST, 1955.

Pounds of Cream**	Number of Plants
1 - 5,000	11
5,001 and over	3
	14†

*Eight Hour day maximum capacity.

**Average test of cream received was 36.5%.

†The total number of plants in this table added to the total in Table 12 results in a sum larger than the number of plants in the study. Some plants handled both milk and cream.

The capacity of all plants in the area is shown in Table 14. Present plant space and equipment, if employed at full capacity for eight hours, could adequately receive and handle approximately three million pounds of milk. The actual amount received is about 65 percent of this figure and about half of this is received from producers located outside the Southeast area.

TABLE 14. ESTIMATED DAILY PRODUCTION CAPACITY OF DAIRY PLANTS, SOUTHEAST MISSOURI PER EIGHT HOUR DAY, AUGUST, 1955.

MILK	2,998,030 pounds
CREAM*	105,829 pounds
(Actual Receipts of Milk)	(1,939,472 pounds)
PRODUCTS	
Milk for Bottling	986,254 pounds
Cottage Cheese	23,643 pounds
Butter	43,415 pounds
Condensed & Evaporated Whole Milk	5,000 pounds
Condensed & Evaporated Skim Milk	15,390 pounds
Cheese	57,100 pounds
Dry Skim Milk	12,545 pounds

*Average test of cream received was 36.5%

Ownership of Plants

Table 15 shows the ownership of dairy plants in Southeast Missouri. Type of ownership is related to the distribution system of the plant. Local proprietor plants were usually relatively small and had a small geographical distributing area. They often distributed their processed products in one or two towns or villages.

Nationwide dairy companies usually distribute their finished product through the system and facilities of the parent company. The markets available and quantities processed are larger because of the wide distribution channels available to the plant. This type of plant may have better facilities for disposing of surplus milk or processed products. In some instances it may be able to ship its surplus to a sister plant in a deficit area.

TABLE 15. TYPE OF OWNERSHIP OF DAIRY PLANTS IN SOUTHEAST MISSOURI, 1955.

Type of Ownership	Number
Local Proprietor	29
Local Corporation	24
Local Partnership	17
Nationwide Dairy Companies	4
Investment Holding Company	1
Total	75

SOUTHEAST MISSOURI COMPARED WITH STATE TOTALS, 1956

	Southeast Missouri	Missouri	Percent Southeast Missouri was of State
Land Area (acres)	13,452,800	44,304,640	30
Land in Farms (acres)	8,397,424	34,195,379	25
Farms (number)	55,225	201,614	27
Population (1950)	1,938,848	3,954,654	49
Rural Population (1950)	538,383	1,521,938	35
Corn (acres)	728,000	3,946,000	18
Wheat (acres)	309,000	1,660,000	19
Tame Hay (acres)	599,000	2,710,000	22
Soybeans (acres)	651,600	1,956,000	33
Cotton (acres)	373,000	373,000	100
Beef Cattle (number)	601,000	3,091,000	19
Hogs (number)	694,000	3,819,000	18
Sheep (number)	36,000	749,000	5
Chickens, Excluding Broilers (number)	3,329,000	14,555,000	23
Milk Cows (number)	166,000	936,000	18
All Farm Products Sold, 1954 (dollars)	196,523,750	733,733,793	27
Income From Sale of Dairy Products, 1954 (dollars)	12,475,017	84,202,959	15

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