

# Missouri Dairy Markets

## Part I NORTHEAST

GARY E. HANMAN AND STEPHEN F. WHITTED

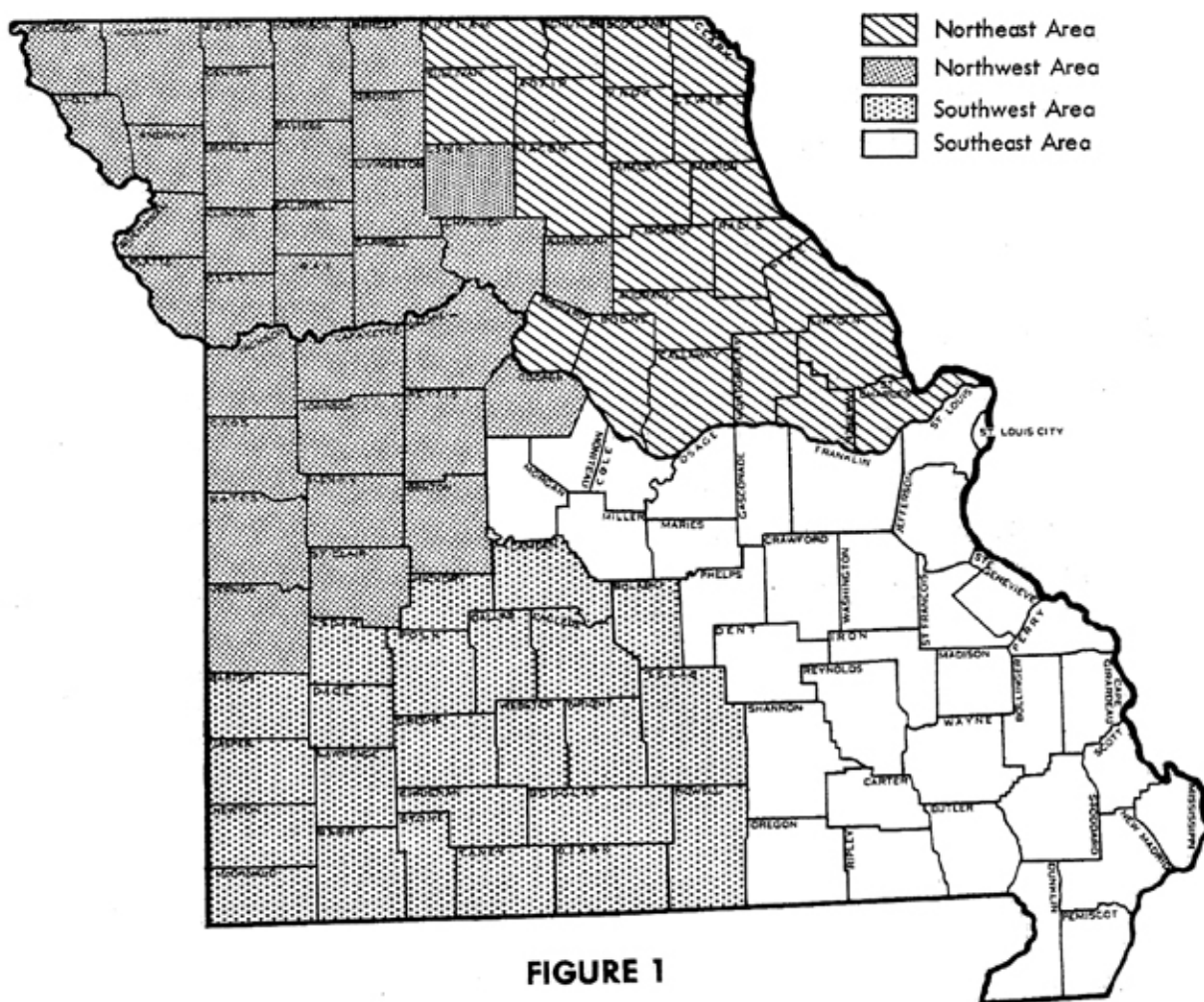


FIGURE 1

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COLUMBIA, MISSOURI

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Project 167, Dairy Industry  
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## SUMMARY AND CONCLUSIONS

1. Since 1920, farm size in the area has increased 32 percent while in the state as a whole the increase has been only 16 percent.
2. The population of the area decreased 18 percent from 1900 to 1950 while the population in the state increased 27 percent.
3. Emphasis placed on corn and wheat has decreased in recent years, while that placed on soybeans has increased. Tame hay acreage has increased in the state but decreased in the Northeast area.
4. Cattle were included in most of the farming systems in the Northeast area. About three times as many were beef cattle as milk cows.
5. As is true for the United States, area farmers who remain in the dairy business have increased the size of their herds. Average increase in herd size for the 22 counties from 1922 to 1950 was 37 percent.
6. The percentage contribution made to total farm income by the sale of dairy products has been decreasing since 1939.
7. Six plants had a capacity of less than 10,000 pounds of milk per day. Only two had facilities to handle more than 100,000 pounds daily.
8. All of the plants in the Northeast area were owned by local concerns.

Dairying occupies a position of minor importance in the farming enterprises of the Northeast area. Northeast Missouri is well suited for the production of cash-grain and the fattening of livestock. At present these types of agricultural enterprises are capable of returning a higher net income on most farms than dairying. Therefore, they are now the predominant systems used.

The decrease in population of the area is evidence that outside employment opportunities are more attractive to the labor force than local employment. This migration of population from the area is associated with the decrease in number of farms. Farmers in the area are enlarging their farms and maintaining expansive types of agricultural enterprises.

The location of the Northeast area is good with respect to markets and the area has the physical capability of producing feed and forage necessary for milk production. If demand should call for it, the Northeast area could be relied on for increased dairy production. Before this will come about, however, the profitability of dairying must improve relative to that of cash grains and livestock fattening.

# Missouri Dairy Markets

## *Part I*

### NORTHEAST

(One of 4 similar studies covering the entire state)

GARY E. HANMAN AND STEPHEN F. WHITTED

### INTRODUCTION

In the fairly recent past, Missouri's dairy output was an incidental result of home consumption. Each farmer kept as many milk cows as was necessary to satisfy the needs of his family for dairy products during the season of low production. This resulted in a surplus supply during the spring and summer which was marketed in the form of sour cream, with the skim milk being fed to the hogs and chickens. This situation still accounts for a considerable portion of the farm separated cream marketed in the state.

Missouri is well located with respect to markets. Two of the larger cities of the United States are located within its boundaries. In addition, Missouri dairy-men are favorably located in relation to markets in the South and Southwest. Due to favorable markets and production situations, dairying has thrived in Missouri. At present, the sale of milk and cream contributes between 12 and 14 percent of the total cash farm income of the state. In addition, the sale of calves and cull cows contributes a sizeable sum. In 1957, Missouri ranked tenth among the states in the total production of milk and produced a little over 3.3 percent of the nation's total milk supply. In the same year Missouri was second in the production of American cheese with 7.3 percent of the total. Missouri produced 4.2 percent of the creamery butter and ranked fifth in this product. In ice-cream production Missouri was twelfth with 2.6 percent of the total.

### Potential Milk Supply

The potential of Missouri as a dairy state was recognized as early as 1904.<sup>1</sup> Missouri has 9 to 11 months of open pasture per year and an average of 233 days of sunshine. Her soils are adapted to production of pasture, forage crops, and grain necessary for milk production. Her mild winters encourage use of relatively inexpensive farm buildings for quality dairy production. Within the borders of the state there are four metropolitan areas which provide markets.

The hand cream separator encouraged the production of cream for market and this became an important source of income to Missouri farmers who soon learned to produce cream in considerable quantities. This provided them with a better income than they had received under the old calf raising system.



The growth of the large metropolitan areas called for an increase in the amount of fluid milk sold through commercial channels. Plants and facilities increased to meet the new demand and today most of the growth of the dairy industry is in production of milk suitable for fluid consumption.

The dairy industry of Northeast Missouri has followed advancements in technology of milk production and processing closely and has responded to these changes in consumer demand. The first permanent dairy established in the Northeast area was at Macon. This plant was started in 1906 as a creamery and today it makes both ice-cream and butter. In 1908, a plant was established at Kirksville. Its first operation was production of ice-cream, later butter and milk processing facilities were added. Today bottled milk is its chief dairy product.

The location of the Northeast area is good with respect to markets and the area has the physical capability of producing feed and forage necessary for milk production. If demand should call for it, the Northeast area could be relied on for increased dairy production. Before this will come about, however, the profitability of dairying must improve relative to that of cash grains, beef cattle grazing and livestock fattening. Such a situation developed during World War II and the area responded with increased output. At the conclusion of the war when other prices advanced rapidly relative to the farm price of milk, milk production in the area declined rapidly.

### Characteristics of the Area

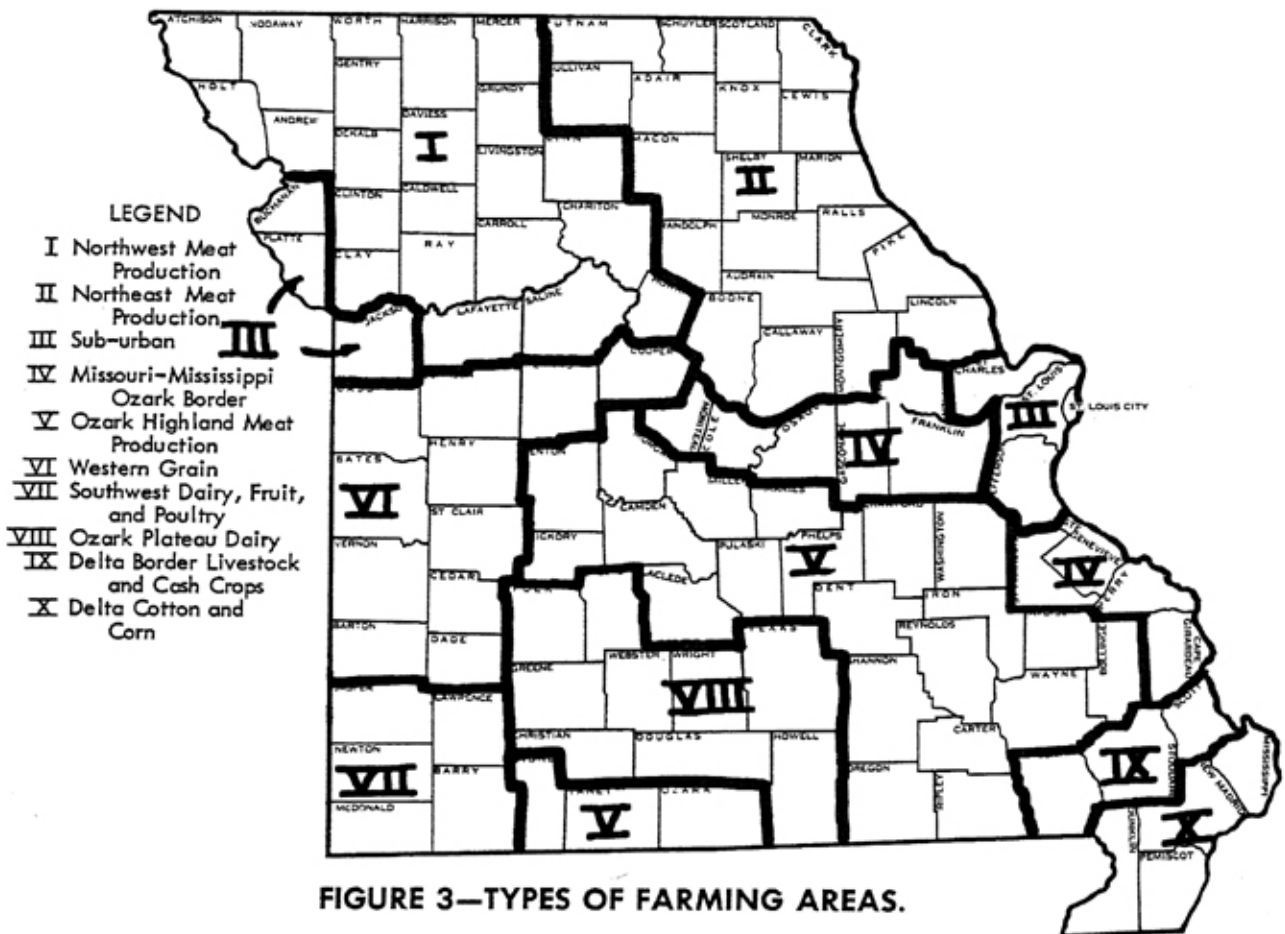
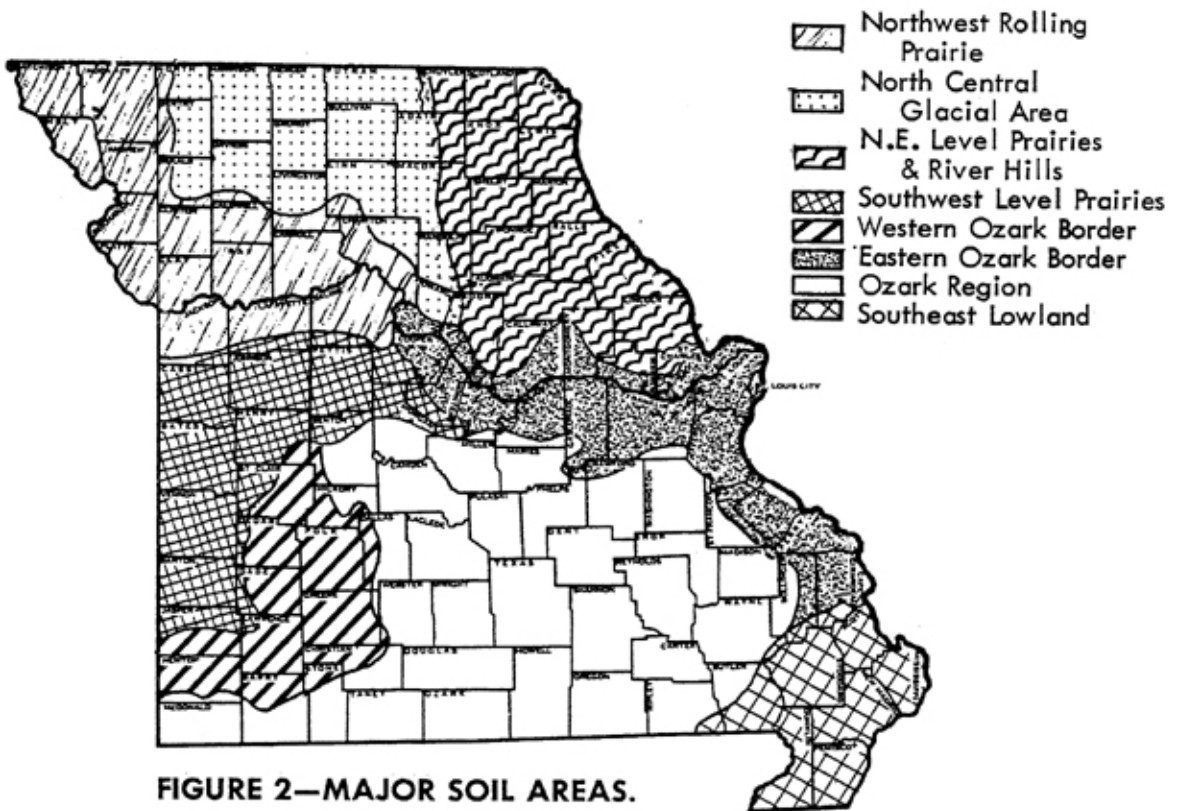
*Physical.* The soils of the Northeast area are of many depths, colors, and types. They vary widely in their origin. The topography varies from extensive level prairie to steep and irregular hillsides. The Northeast area is completely in the north prairie region and can be classified in three of the major soil groups<sup>2</sup>.

The western part of the Northeast area is in the eastern half of the north central glacial area (Figure 2). The soils are gray-brown and shallow in depth. They are predominantly of the Shelby and Grundy types, which are glacial till.

The majority of the area is in the northeast level prairie and river hills region. The soil is predominantly Putnam silt loam with great acreages of Lindley loam occurring along the breaks. The Putnam, because of its level topography and texture, is easily tilled. Practically all of it is in cultivation for corn, wheat, soybeans, and grasses. Bluegrass thrives and a general type of farming is practiced, with emphasis on livestock production.

A small part of the southern portion of the area is in the eastern Ozark border area.

Precipitation is seldom a limiting factor in crop production. Northeast Missouri's average annual rainfall varies from 38 inches in the north to 45 inches along the river. Approximately two-thirds of this falls during the spring and summer months in the form of warm rain. This distribution of rainfall is favorable for the production of corn, soybeans, and grasses of many kinds, which require that most of their moisture be distributed in the early part of the growing season.



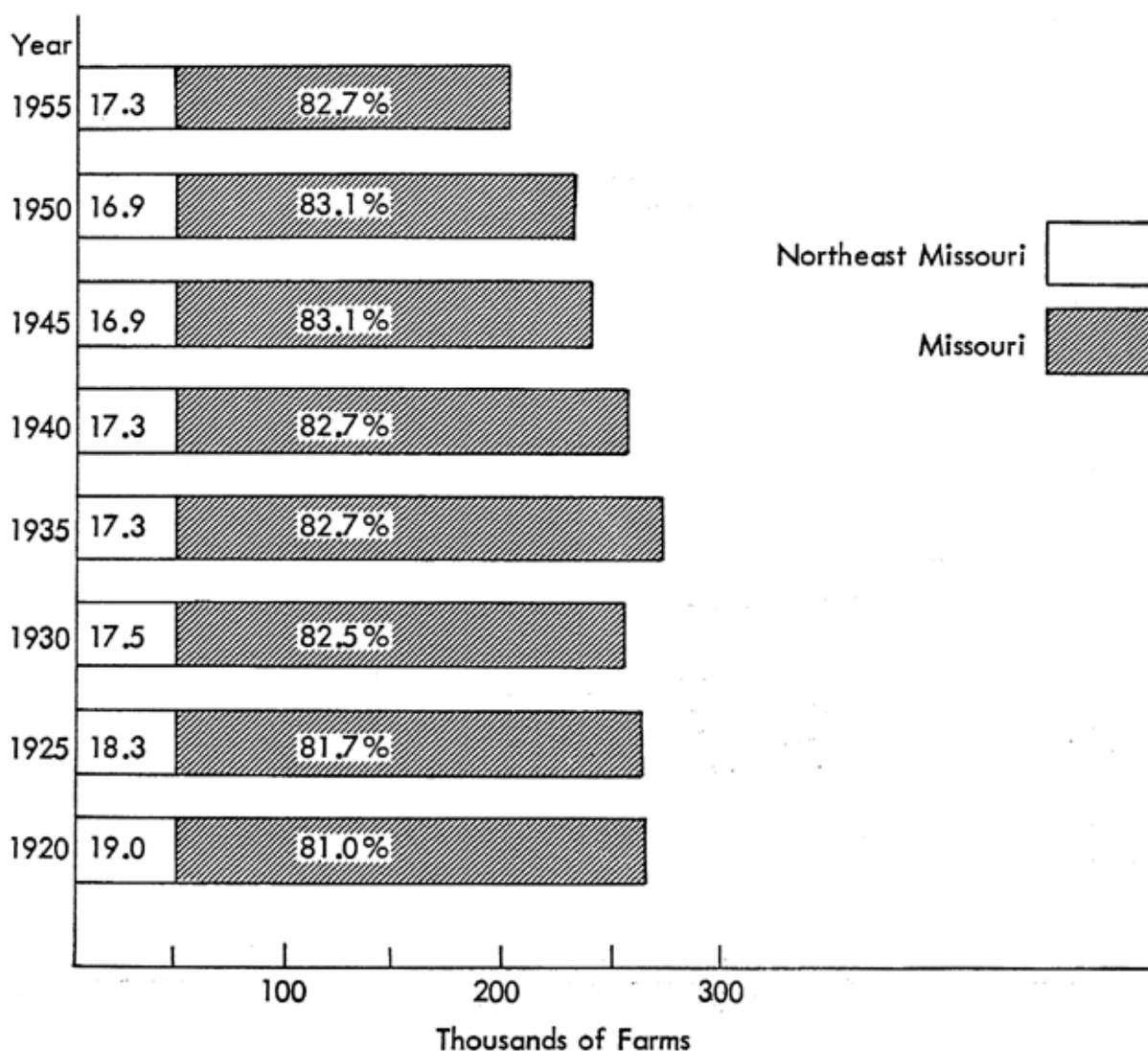
Temperatures vary from 91° F average maximum in July to 16° F average minimum in January. The last killing freeze in the spring comes about April 15-20; the first killing frost in the fall occurs October 15-20.

Most of the Northeast area is classified in the northeast meat production area (Figure 3). The farms are used for the production of grain, which is either sold for cash or marketed through livestock. It is not predominantly an area of dairy production.

*Farm and Population.* The farm is the basic production unit in the agriculture industry. Certain trends are taking place within these units that have changed or will change the characteristics of Missouri agriculture.

In 1920, there were 263,004 farms in Missouri (Figure 4). This number had decreased to 201,614 by 1955.

**FIGURE 4**  
**NUMBER AND PERCENTAGE OF FARMS—NORTHEAST AREA VS. STATE**



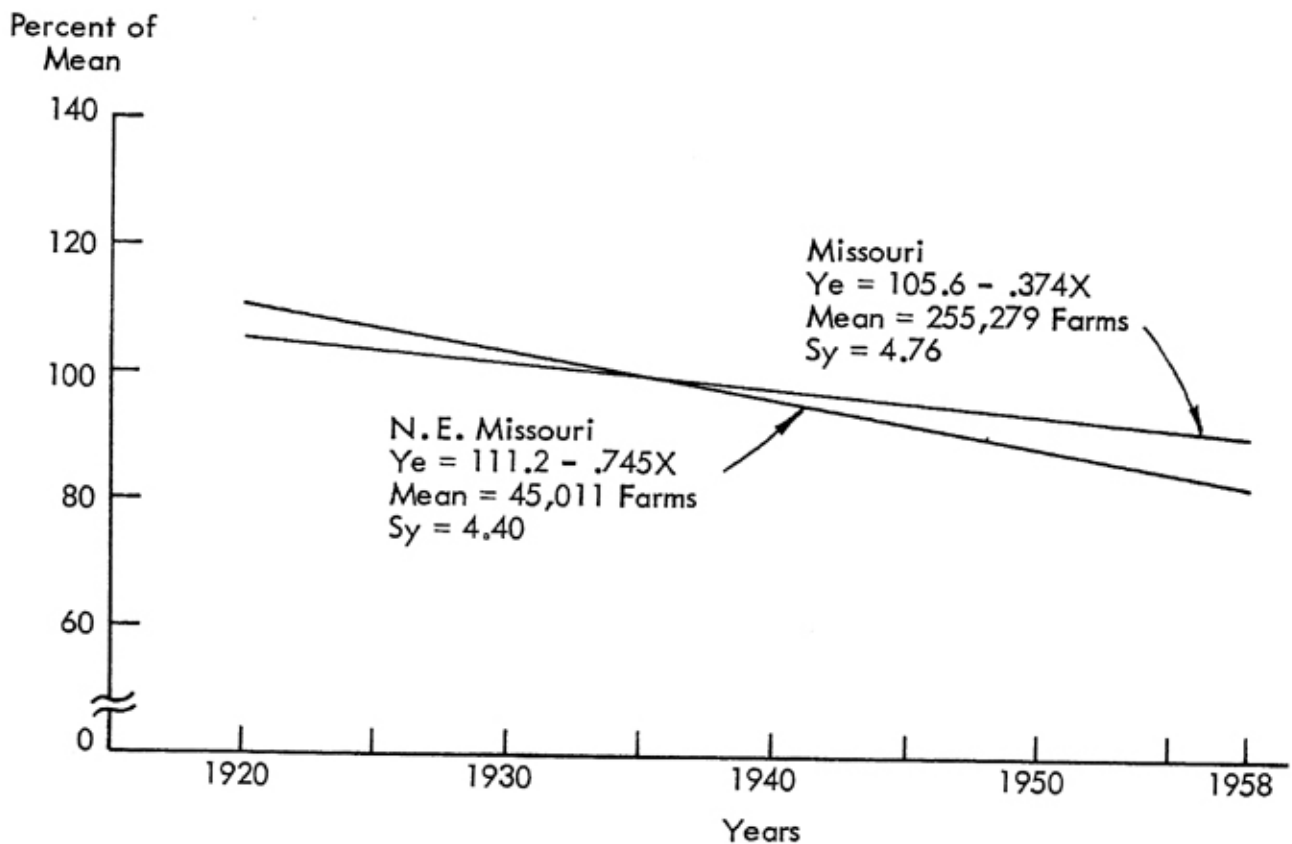
The number of farms in the Northeast area has followed about the same pattern as the state as a whole; in 1920 there were 49,980 farms; by 1955 there were 34,959. Figure 5 indicates the relative rates of decrease in number of farms in the state and in the Northeast area.

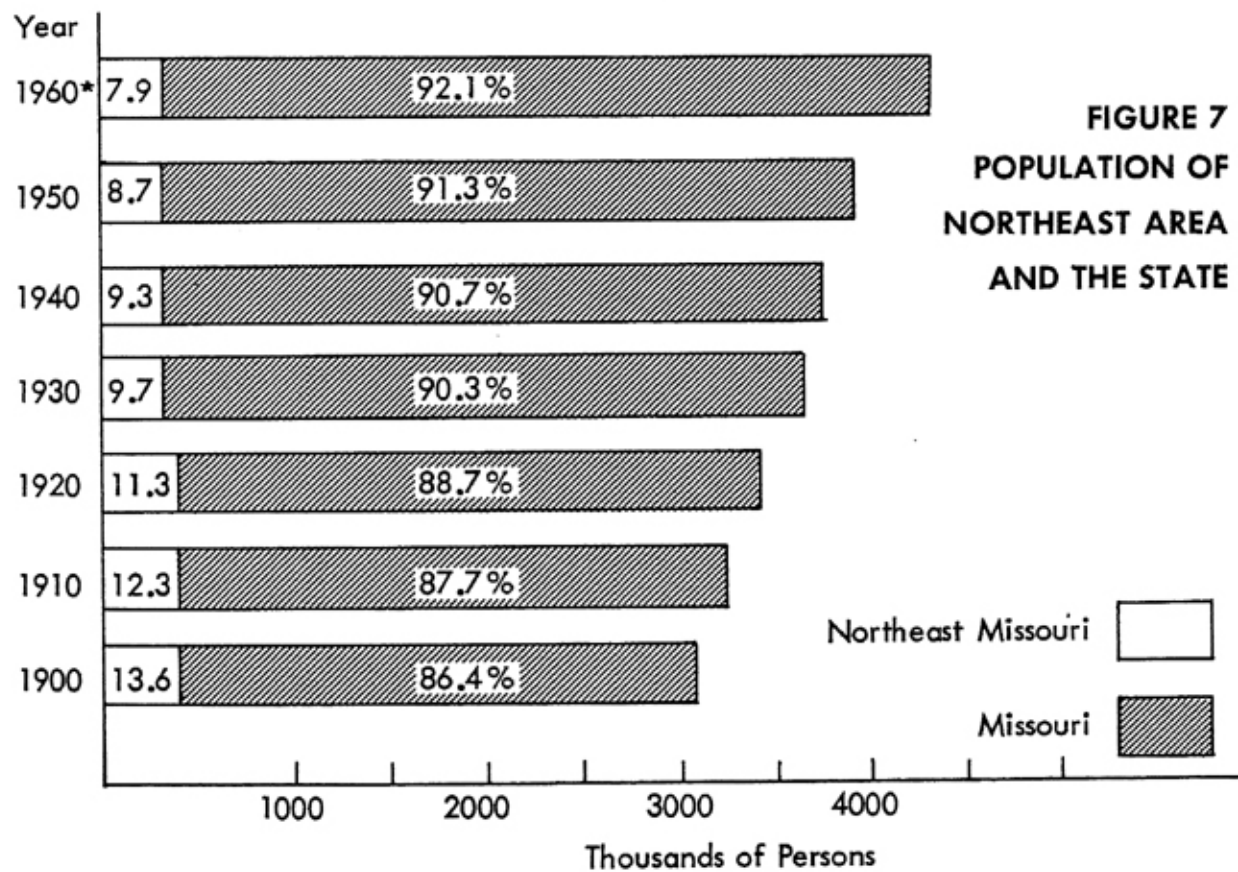
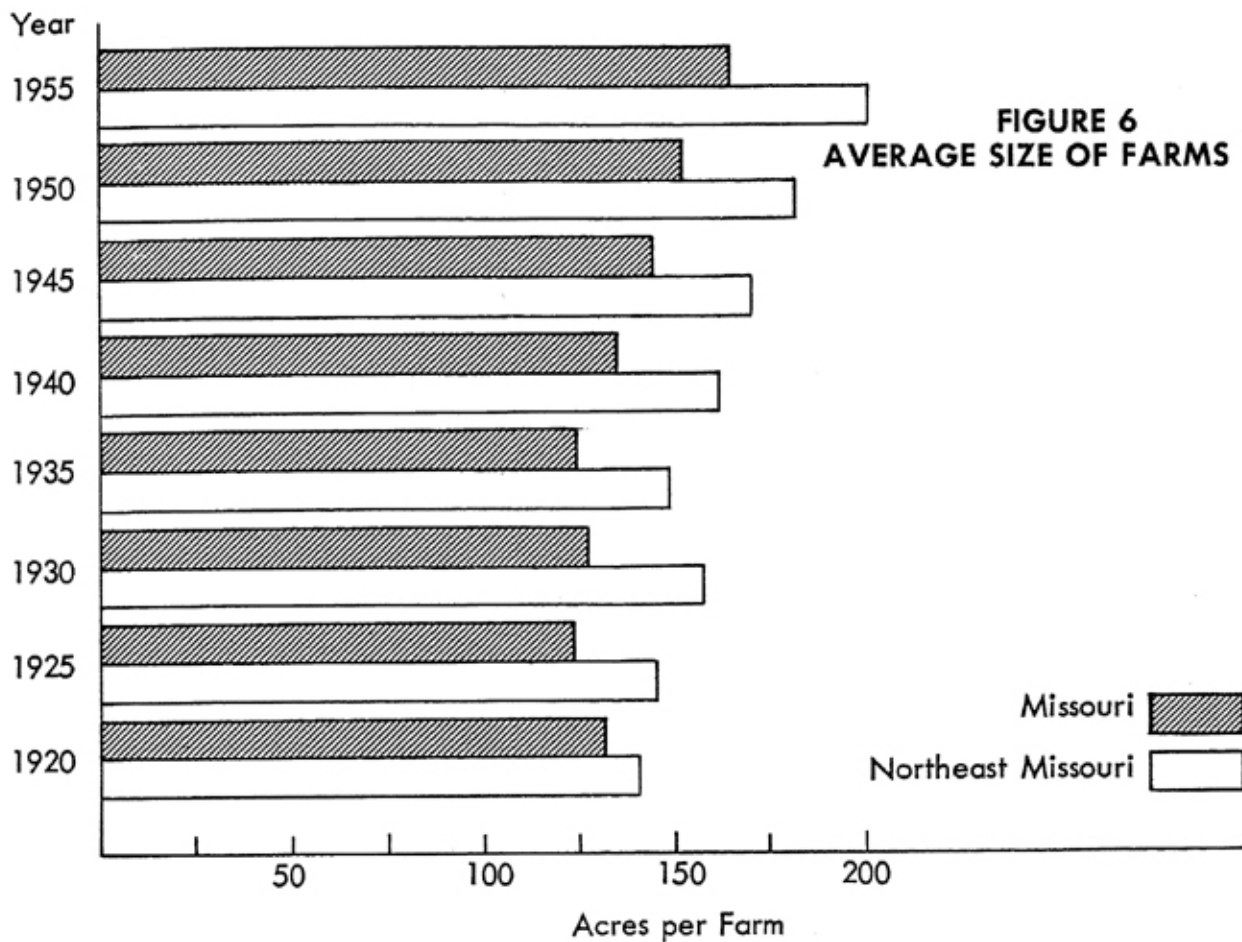
Since the total area in farms remains about the same, except for that taken over by cities, highways, and lakes, this decrease in the number of farms has been associated with an increase in the average size of farms. In the Northeast area the average size of farm increased from 138 acres in 1920 to 198 acres in 1955 (Figure 6). The increase was not as great in the state as a whole: 132.2 acres in 1920 and 169.6 in 1955.

In each 10 year period since 1900 the population in Missouri has been greater than in the previous period (Figure 7). In 1900, Missouri's total population was 3,106,665. There has been an average increase of 5 percent each decade. Missouri's population had reached 3,954,653 by 1950, a 27 percent increase for the 50 year period.

Contrary to the state total, population decreased in Northeast Missouri. Total population in the Northeast area was 422,058 in 1900. From 1900 to 1930, there was an average decrease of 6 percent each 10 year period. The 1940 census

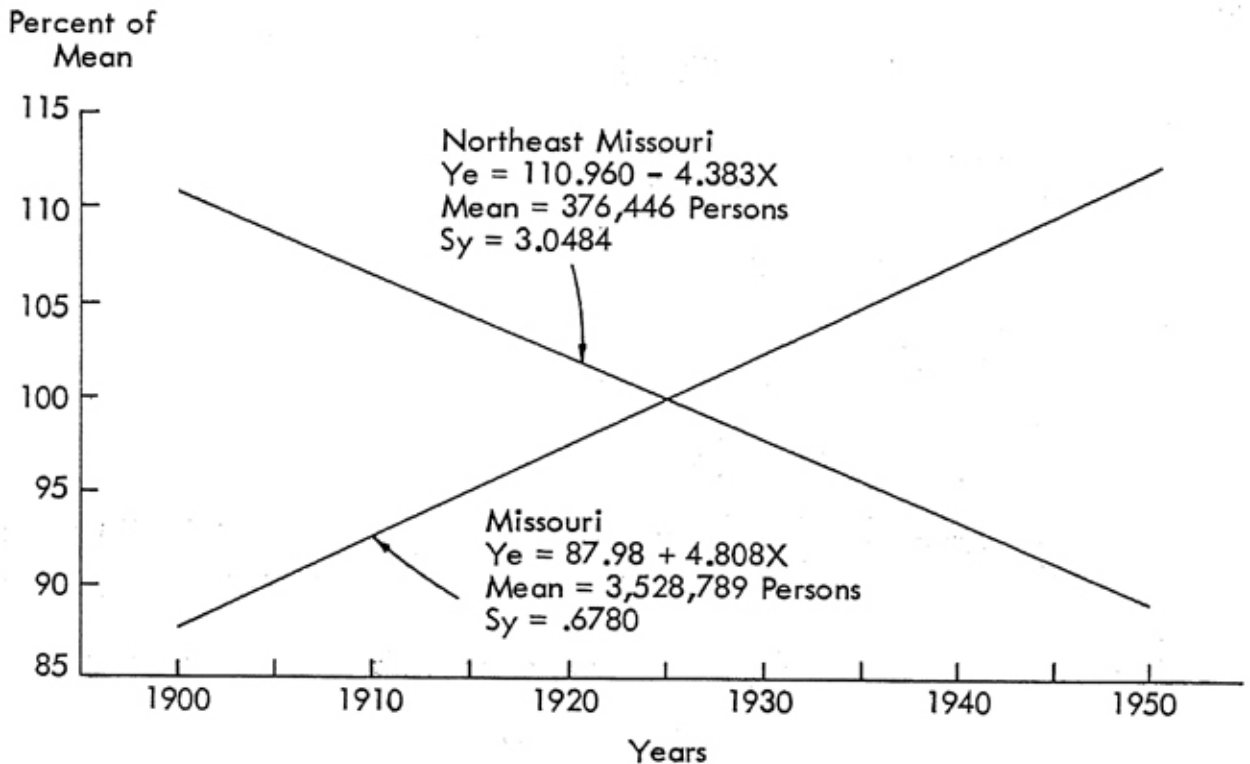
**FIGURE 5**  
**TREND IN NUMBER OF FARMS**





\*Estimate, Missouri Bureau of Vital Statistics.

**FIGURE 8  
POPULATION TREND**



recorded a slight increase, but by 1950 total population in the area was down to 345,237 for an 18 percent decrease during the 50 year period.

Figures 7 and 8 compare population trends in the area and in the state. Note that the Northeast area had 13.6 percent of the state's population in 1900 and only 8.7 percent by 1950; estimates predict a decline to 7.9 percent by 1960.

#### Marketing System—Farm to Plant

The most important markets in the area are Columbia, Kirksville, Hannibal, and St. Charles. They draw heavily on the area for their milk but they are relatively small. St. Louis is the primary large volume market for milk produced in the area.

If milk is to be used for fluid consumption, milk trucks make daily visits to each producer's farm, except with bulk handling, where every other day pickup is the usual method. Trucks that pick up and deliver milk destined for manufacturing purposes usually stop only once every other day in the winter months but make daily stops in the summer. Many of these collection routes overlap. This duplication of routes increases total procurement cost. The extra cost, in the long run, is largely borne by the farmer. The number of routes in the area increased from 73 operated by 12 firms in 1945 to 98 operated by 16 firms in 1954. Some of the additional plants were operating in 1945 but did not have routes.



Not only has the number of firms increased but individual plants have expanded. Table 1 summarizes information on the 10 plants for which complete

TABLE 1. NUMBER OF ROUTES, NUMBER OF PATRONS AND LENGTH OF ROUTES, NORTHEAST MISSOURI, 1945, 1950, 1952, 1954.

	1945	1950	1952	1954
Total Number of Routes:	68	76	77	82
Total Number of Plants: <sup>1</sup>	10	10	10	10
Average Number of Routes Per Plant:	6.8	7.6	7.7	8.2
Total Number of Patrons:	1563	1880	2211	2505
Average Number of Patrons Per Route:	23.0	24.7	28.7	30.5
Total Length of All Routes:	1930	2163	2306	2460
Average Length of All Routes	28.4	28.4	29.9	30.0

<sup>1</sup>Number of plants from which complete data were available for the 9 year period.

data were available over the 9 year period. The number of producers served by each milk hauler increased, but the haulers have not had to lengthen their routes materially.

There were 184 delivering milk directly to plants in 1945. By 1954, the number had increased to 248. This growth has been encouraged by the great increase in the number of pickup trucks owned by farmers.

Milk is a highly perishable product; special precautionary measures must be taken to keep the product from deteriorating while it is in transit. Heat, dust, dirt, and odor have harmful effects on its quality.

*Equipment.* Since most of the deliveries are made by truck, the type of truck body has much to do with the protection of the milk while in transit. There are three general types of bodies used on trucks for milk collection: open style, closed and not insulated, and closed and insulated.

The open style truck body has no overhead or side wall protection from sunlight or dust. The closed and not insulated body style provides protection from the direct rays of the sunlight and from dust but does not give a barrier to outside heat.

The third type of body is completely closed and insulated. A block of ice may be put inside to keep temperatures low during hot weather. In the Northeast area, this closed and insulated body style has largely replaced the other types (Table 2).

TABLE 2. TYPE OF MILK COLLECTION TRUCK BODIES USED, NORTHEAST MISSOURI, 1945, 1950, 1952, 1954.

Type of Truck Body	Year							
	1945		1950		1952		1954	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Open	43	57	33	37	36	33	24	20
Closed and Not Insulated	11	15	12	14	16	15	16	14
Closed and Insulated	21	28	44	49	57	52	79	66
Total	75	100	89	100	109	100	119	100



Data on the type of cream collection truck bodies used were not available. Most of the managers of cream plants said that improvements were being made on their trucks. They indicated that changes made in their collection equipment probably were similar to those made for milk collection.

Insulated trucks are expensive. Many haulers cannot afford to purchase such elaborate equipment. In many cases the plants own the trucks and lease them to individual haulers. Other plants have buying agreements whereby they pay a certain part of the purchase price or finance the purchase for the hauler in order to have their collection trucks equipped with insulated bodies.

*Services to Producers.* As the dairy industry became more specialized and the distance between processor and producers increased, it became evident that some form of contact should be maintained between plant and farmer. Managers of plants found that they could buy supplies and perform services at less cost than individual producers. This gave them an excellent opportunity to maintain contact with producers and establish good producer relations. When one plant performs certain services for its patrons, other plants are forced to do likewise or be at a competitive disadvantage in bidding for milk in the area. Producers have become accustomed to having such services performed for them.

Seven plants in the Northeast area maintained field men who worked directly with producers. These field men performed assorted types of services such as helping producers plan and build new barns and milk houses and helping reduce losses due to rejections. Assistance of the field men usually was provided without direct charge to the producer. Only the larger plants, however, had enough volume to warrant such service.

Several of the managers reported that their milk haulers performed these services for patrons. If this is to be a satisfactory substitute for a full time field man, these haulers must be well qualified in the field of dairying.

Most of the processors provided a line of supplies such as sediment filter disks, washing powder, sterilizing agents, calf feed, strainers, cans, pails, fly spray, disinfectants, paper towels, and many drugs. These supplies could be purchased from the plant and payment for them deducted from the producer's next pay check. Most of the plants bought supplies in large quantities and sold them to producers at cost. This further indicates that these services were extended as a means of promoting good relations and not as a source of profit.

Manufactured dairy products were sold to producers by 19 of the 27 plants in the area. Such products as butter, cheese, and ice cream were the most commonly available, but some plants also included chocolate milk, orange drink, and oleo margarine. These products could be purchased from the dairy directly by patrons or in many instances the milk hauler took orders and delivered the products to producers on his route. A few plants purchased manufactured dairy products in addition to their own line in order to have a large variety available to their patrons.

Very little equipment was made available on a rental basis to the patrons. One plant furnished milk coolers, milk dispensers, ice cream and milk cabinets. However, these usually were not rented to producers but were available only to retail outlets handling the products of this plant. A few plants acted as agents for the sale of such products as cow clippers, white wash equipment, and de-horning equipment. Some of the managers worked closely with other organizations in helping farmers improve forage production on their farms.

Some firms were helping their patrons acquire coolers and milking machines. This equipment was furnished on credit with small down payments. Monthly payments were then deducted from the milk check of the purchaser. This program was initiated primarily as a quality improvement system, in areas where the percentage of producers who owned coolers was low. Other credit was extended for dairy products purchased, and in many plants the majority of the transactions were made through the use of credit. One operator reported that 75 percent of his total sales were on a 30 day credit program.

Artificial insemination was very popular in certain regions. This probably was due to the small number of cows per herd, which made it unprofitable for producers to keep a bull. No plants in the area employed a trained inseminator but many of them acted as a call station for producers.

### Competing and Complementary Farm Enterprises

The Northeast area is shifting to a livestock economy. Emphasis placed on grazing livestock has increased. Emphasis placed on grain crop production is decreasing but not as fast as it is in the state as a whole.

*Corn.* Since 1920, the trend for total acreage of corn has been downward in both the Northeast area and the state. In 1920 there were 1,440,000 acres of corn in the Northeast area (Figure 9). This was 22 percent of the state total. Since 1925, corn acreage has declined in the area though not as rapidly as in the state as a whole (Figure 10).

*Soybeans.* There were 68,000 acres of soybeans grown for beans in the area in 1941 (Figure 11) and 714,300 acres in 1956. This was an increase of 950 percent in a 15 year period (Figure 12). The percentage of Missouri soybeans located in the Northeast area has remained relatively constant since 1941 at about 36 percent.

Missouri had 187,000 acres of soybeans grown for beans in 1941. By 1956 the acreage had reached 1,956,000 acres, an increase of 945 percent over the 15 year period.

*Wheat.* The trend in wheat acreage, both in the state and in the Northeast area, has been down since 1920 (Figure 13). In 1920 the area had 566,000 acres (Figure 14). A low was reached in 1942; since then wheat acreage in the Northeast area has increased gradually. The area fluctuations in wheat acreage have paralleled those in the state.

*Tame Hay.* In 1920 there were 2,590,000 acres of tame hay in Missouri (Figure 15). The trend was upward until 1951, except for a decline during the drouth years of the 1930's.

The Northeast area acreage has been decreasing since 1920 (Figure 16).

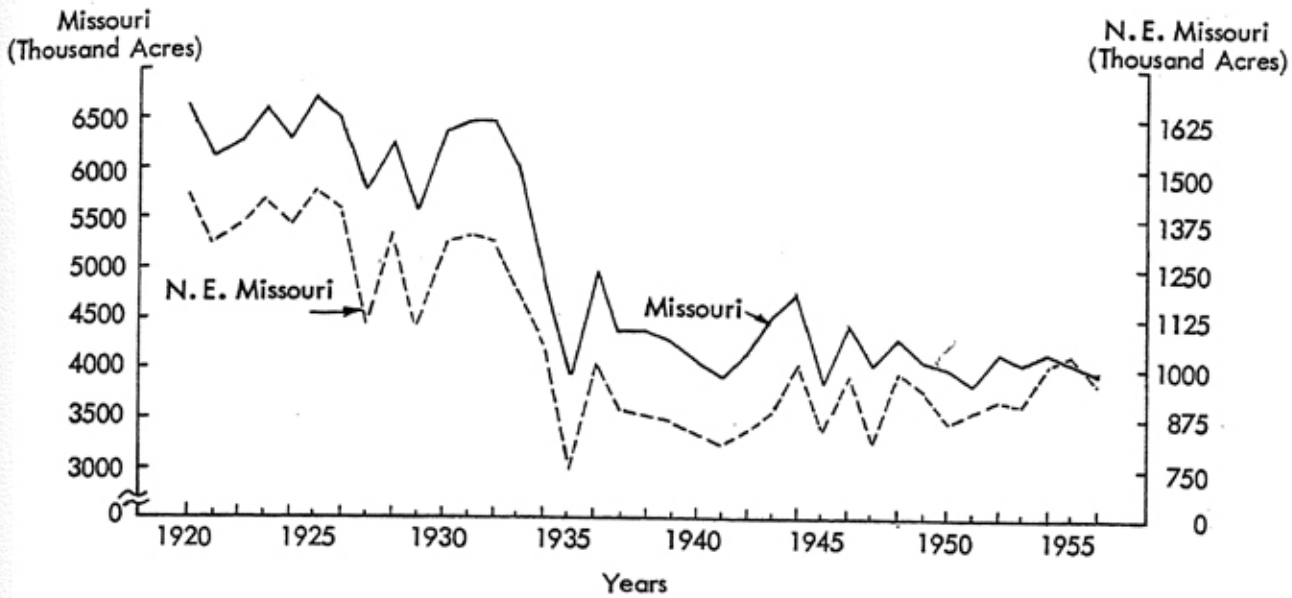
*Beef Cattle.* Cattle are included in the operational systems of most farms in the Northeast area. Data for cattle other than milk cows included replacement dairy heifers and calves. In 1920 there were 420,000 beef cattle in Northeast area (Figure 17). This was about 76 percent of all cattle reported or three times the number of milk cows. The fluctuations in state numbers roughly parallel those of the area. In 1958 there were 633,000 head of beef cattle in the area, which was 86 percent of all the cattle in the area and 21 percent of the state total. There has been an upward trend in the number of beef cattle both in the area and in the state (Figure 18).

*Hogs.* There has been a slight long term down trend in hog numbers both in the area and in the state but the decrease has been relatively greater in the state as a whole (Figure 19). Figure 20 shows changes over the years. The slight reduction in hog numbers probably is related to the lower corn acreage of recent years.

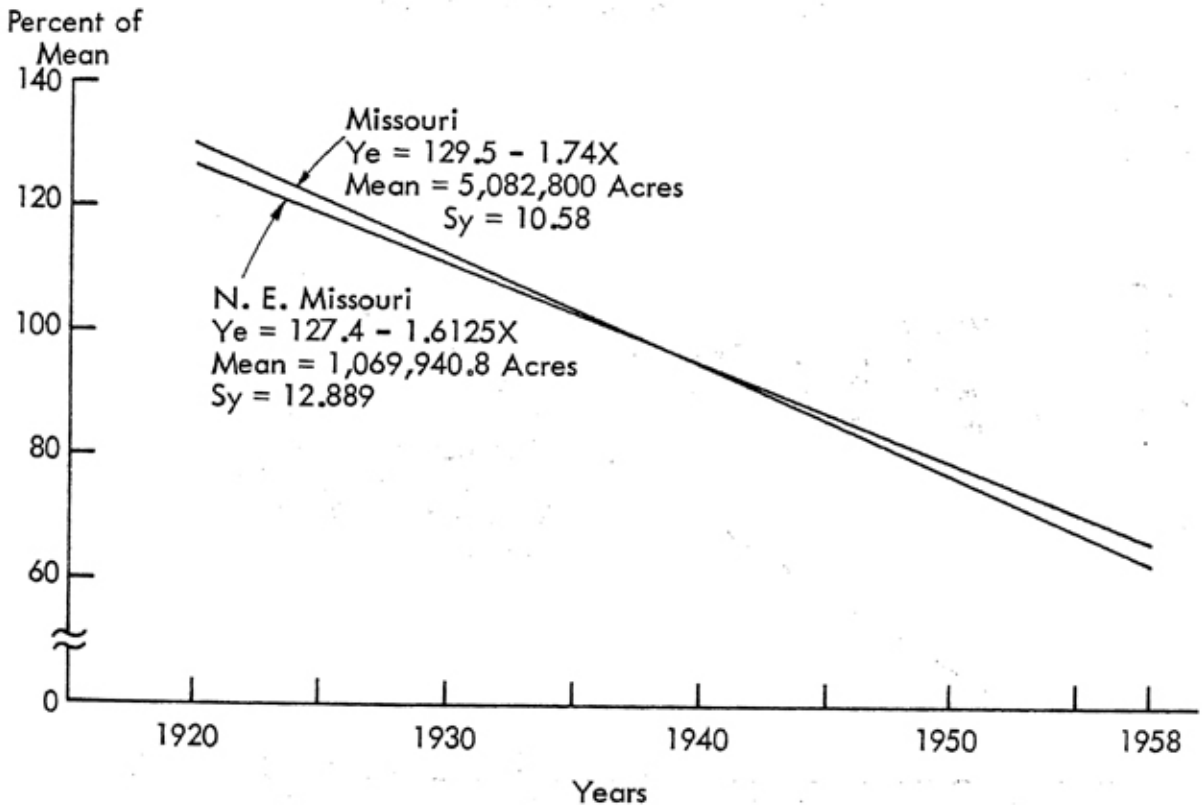
*Sheep.* The leading counties in sheep production are located in the Northeast area. In 1954, Schuyler, Monroe, Scotland, and Sullivan were the state's four top counties in sheep production. The number of sheep on farms in the area has been increasing over the long term but the state as a whole has shown a greater increase (Figure 21). In 1920 there were 380,000 head of sheep in the area (Figure 22). This increased for 22 years to a peak in 1942 of 530,000 head. Numbers declined from that point to 269,000 head by 1958, which was 36 percent of the total number in the state.

*Chickens.* In 1924 there were 7,285,000 chickens in the Northeast area (Figure 23). This number declined to 2,743,800 birds in 1958, a 62 percent decrease over a 34 year period. This trend has been generally true for the state as a whole, though the area has been decreasing at a more rapid rate (Figure 24).

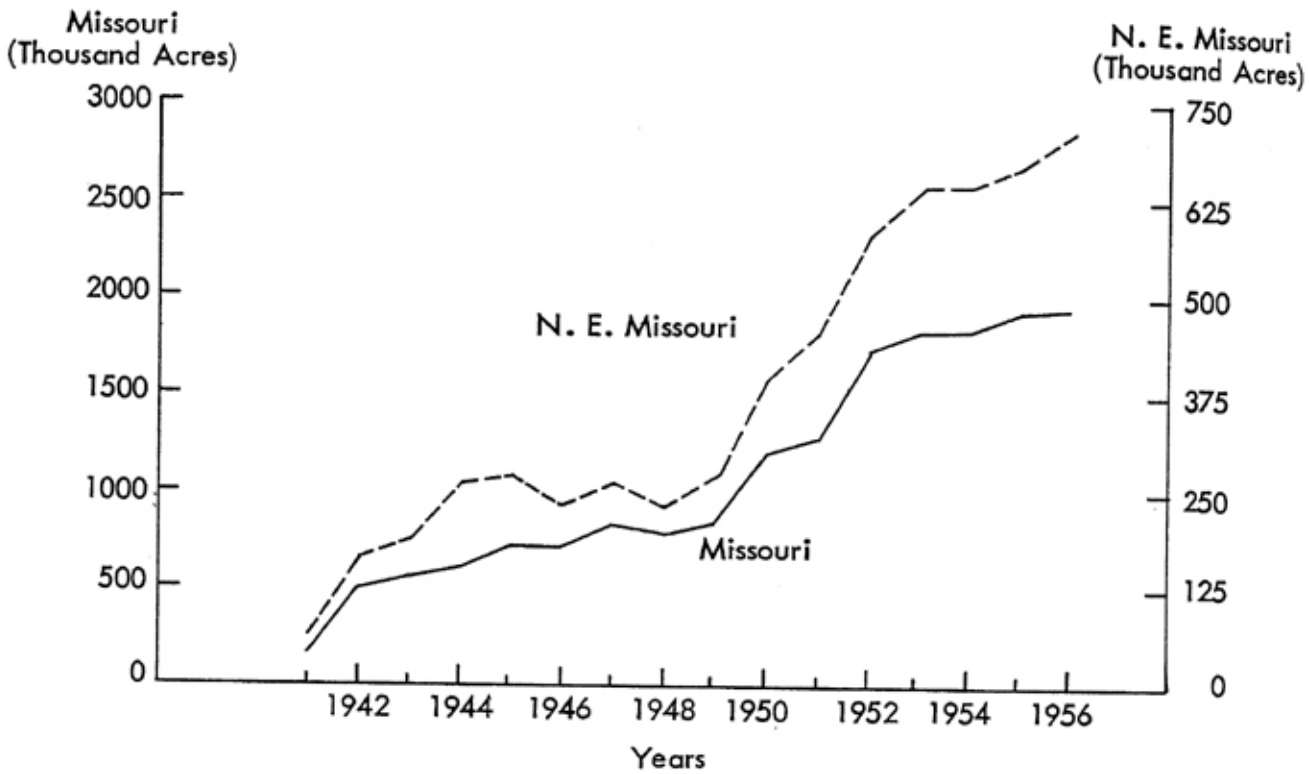
**FIGURE 9  
ACREAGE OF CORN**



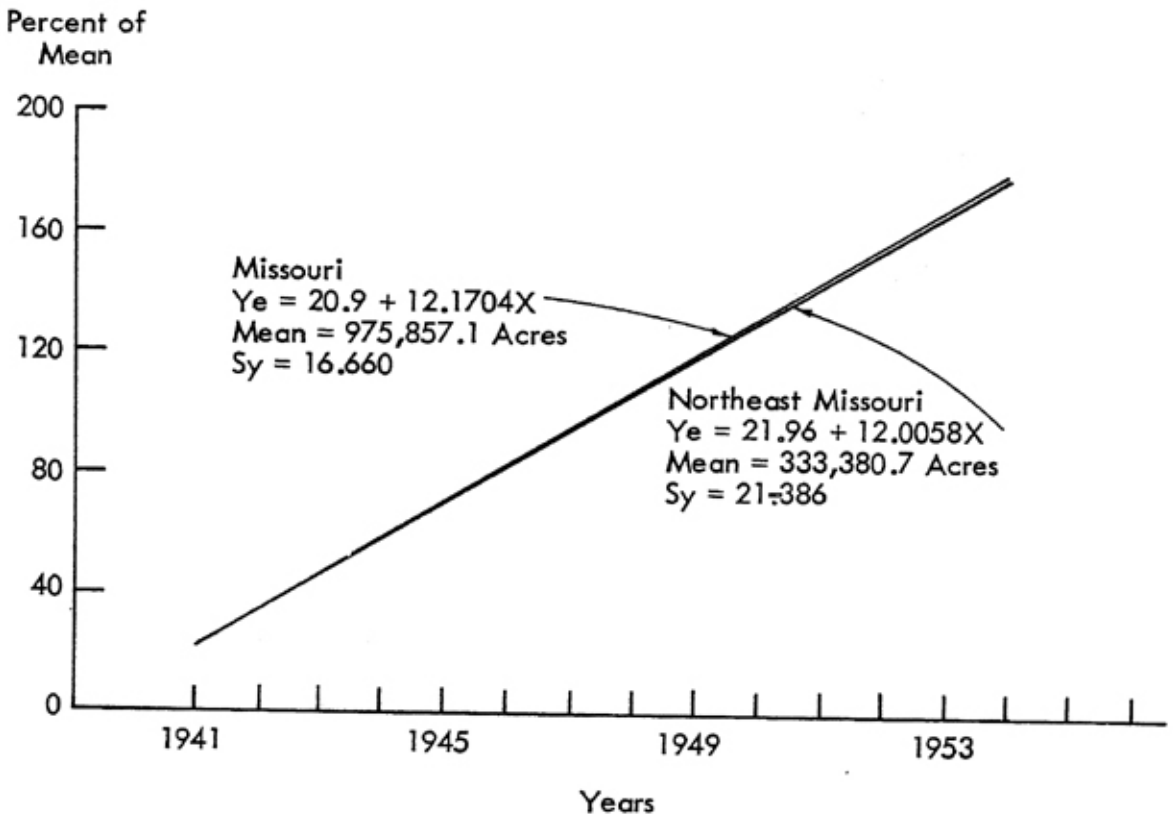
**FIGURE 10  
TREND IN ACREAGE OF CORN**



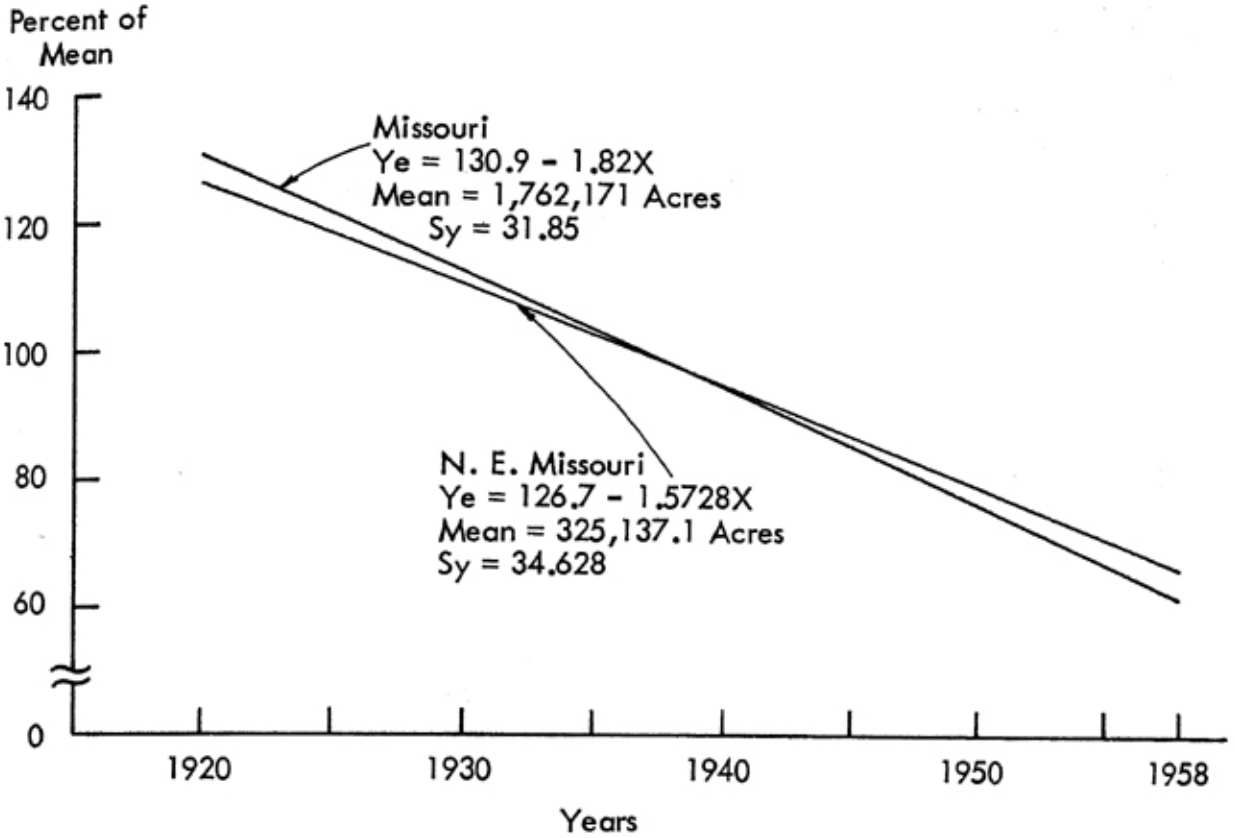
**FIGURE 11**  
**ACREAGE OF SOYBEANS**



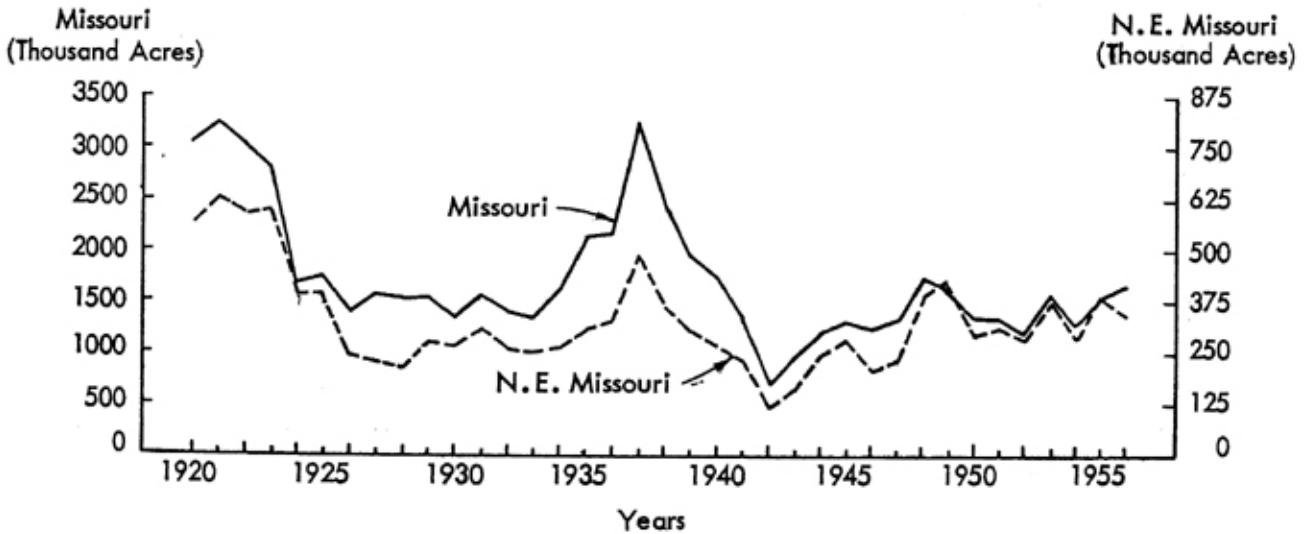
**FIGURE 12**  
**TREND IN ACREAGE OF SOYBEANS**



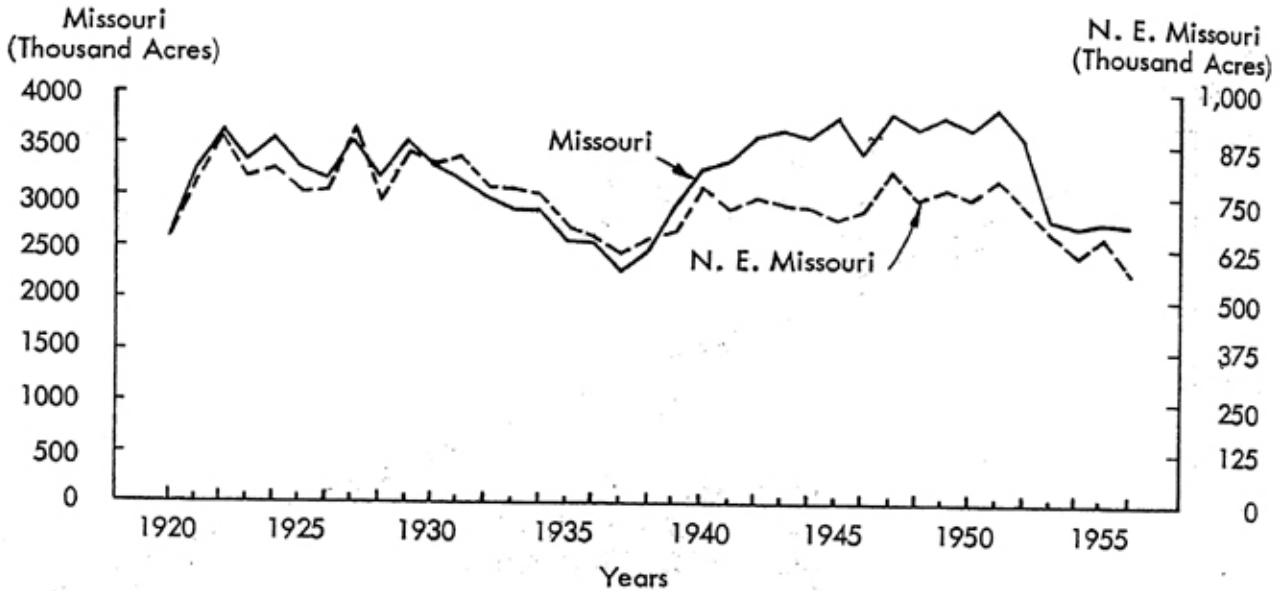
**FIGURE 13**  
**TREND IN ACREAGE OF WHEAT**



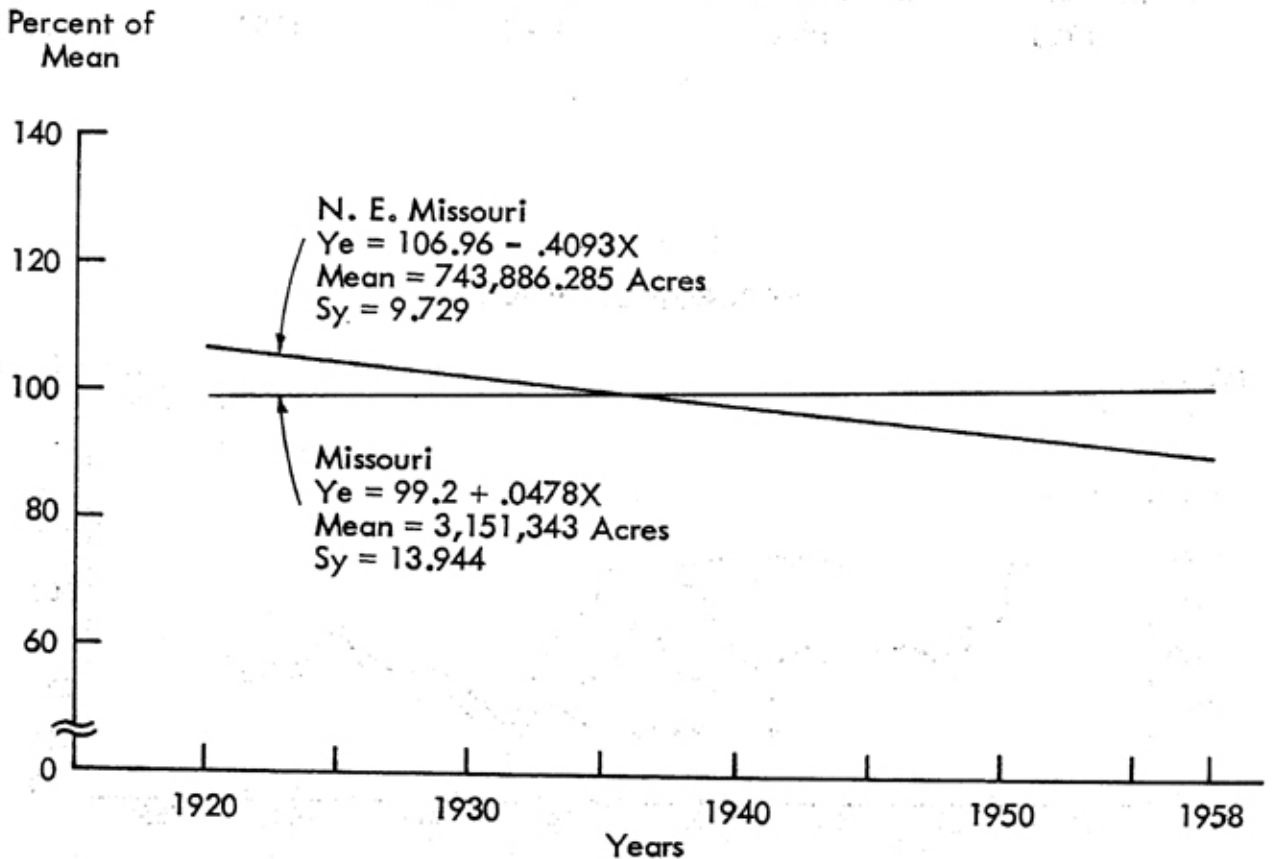
**FIGURE 14**  
**ACREAGE OF WHEAT**



**FIGURE 15**  
**ACREAGE OF TAME HAY**

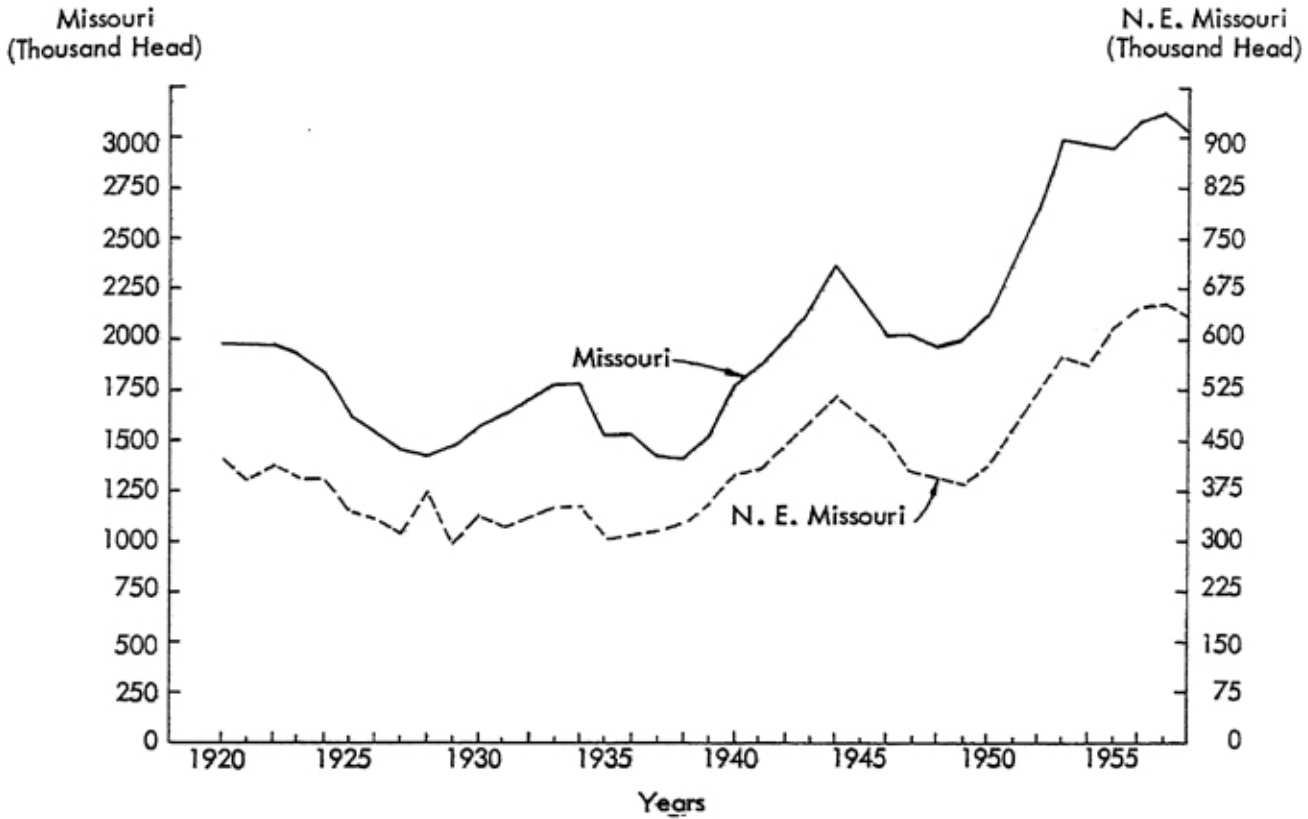


**FIGURE 16**  
**TREND IN ACREAGE OF TAME HAY**

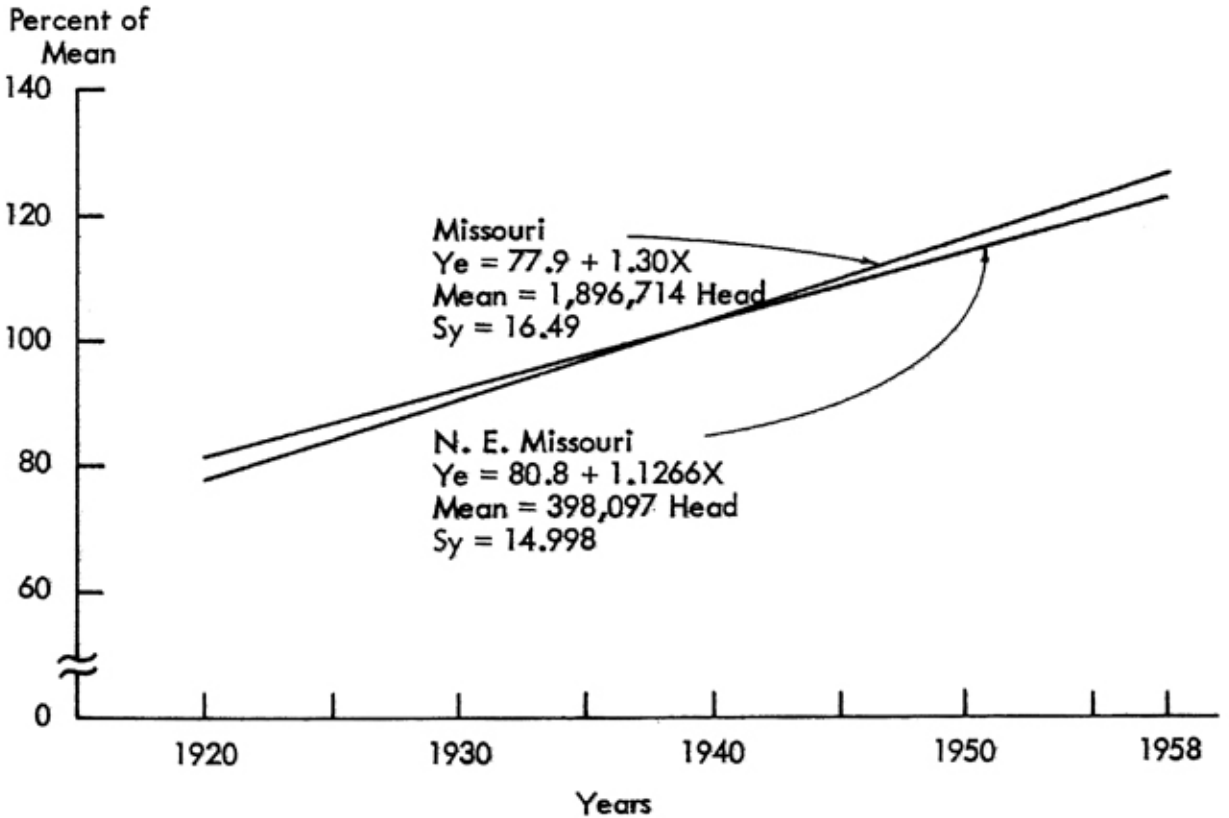




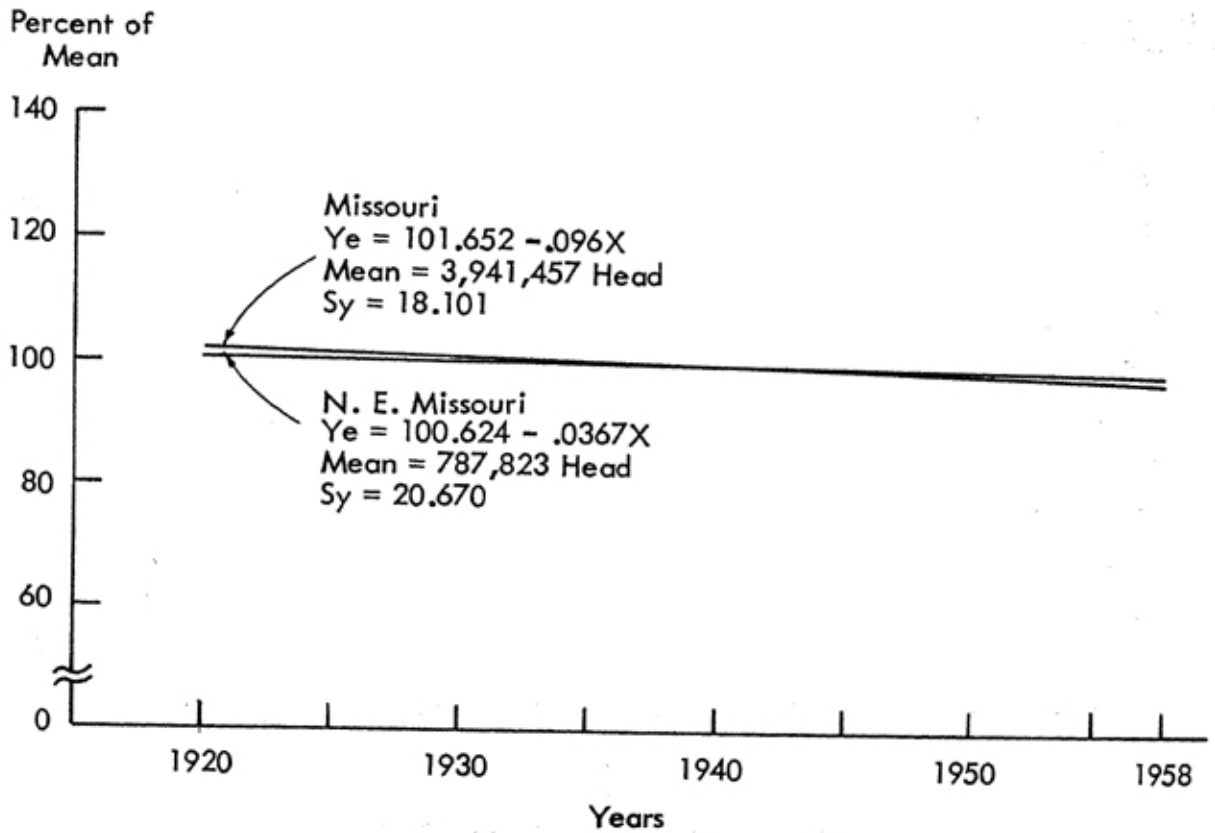
**FIGURE 17**  
**NUMBER OF BEEF CATTLE**



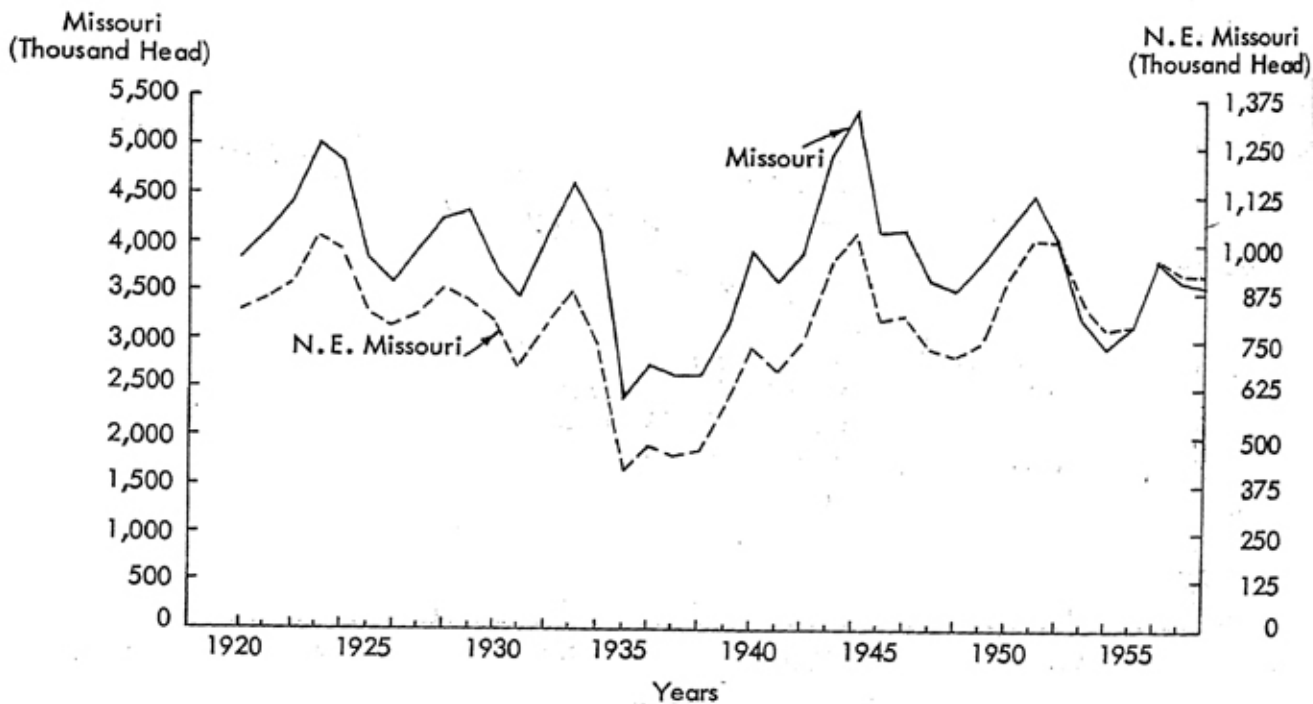
**FIGURE 18**  
**TREND IN NUMBER OF BEEF CATTLE**



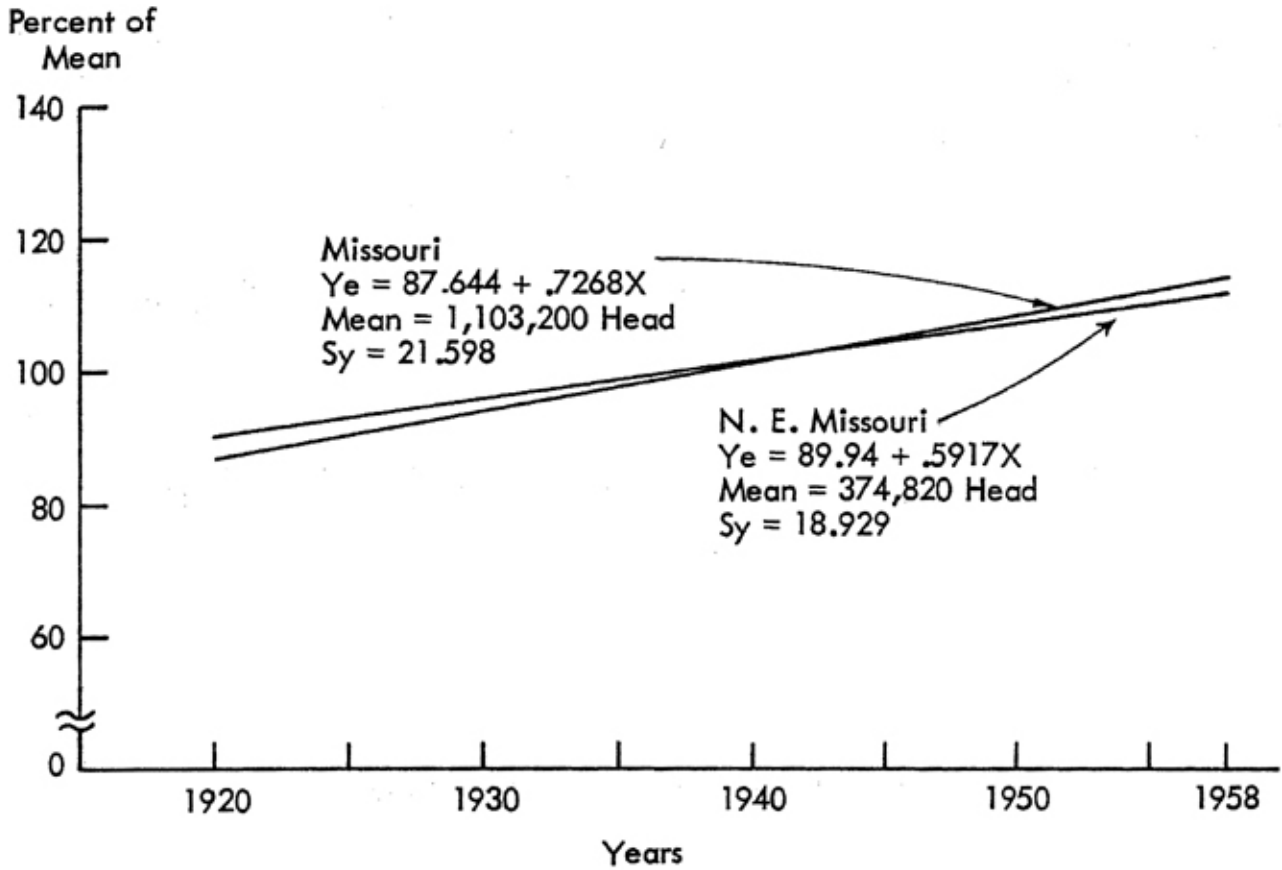
**FIGURE 19**  
**TREND IN NUMBER OF HOGS**



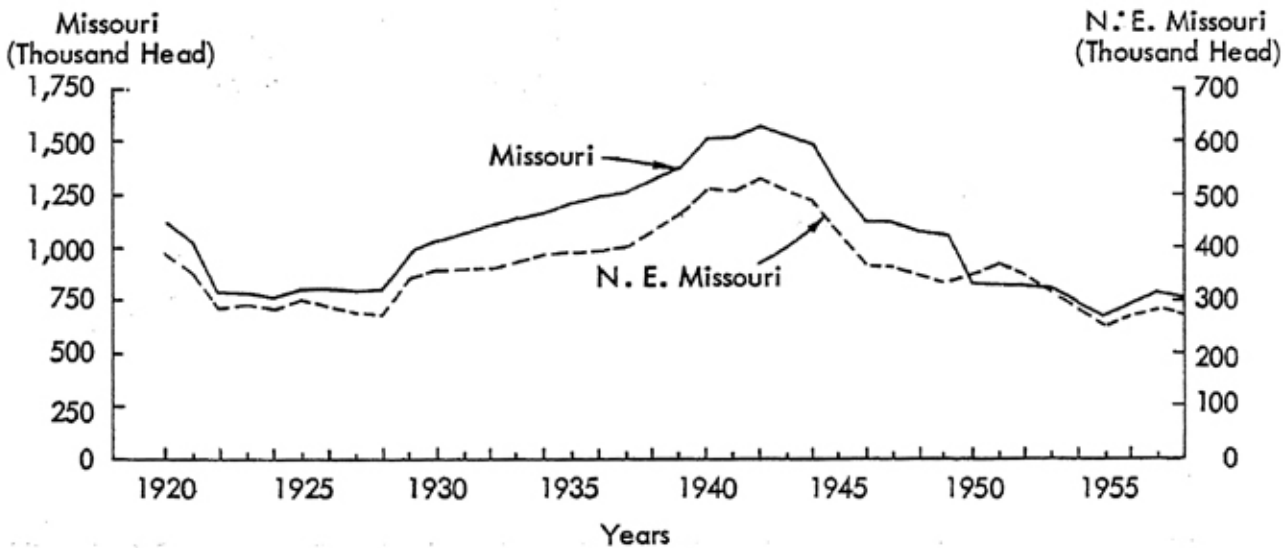
**FIGURE 20**  
**NUMBER OF HOGS**



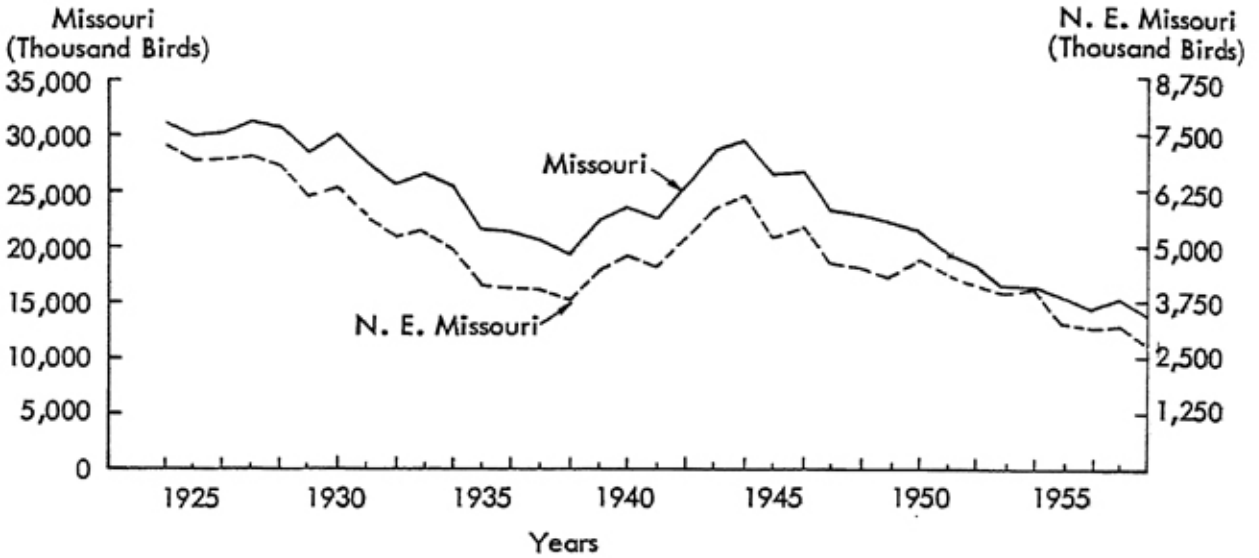
**FIGURE 21  
TREND IN NUMBER OF SHEEP**



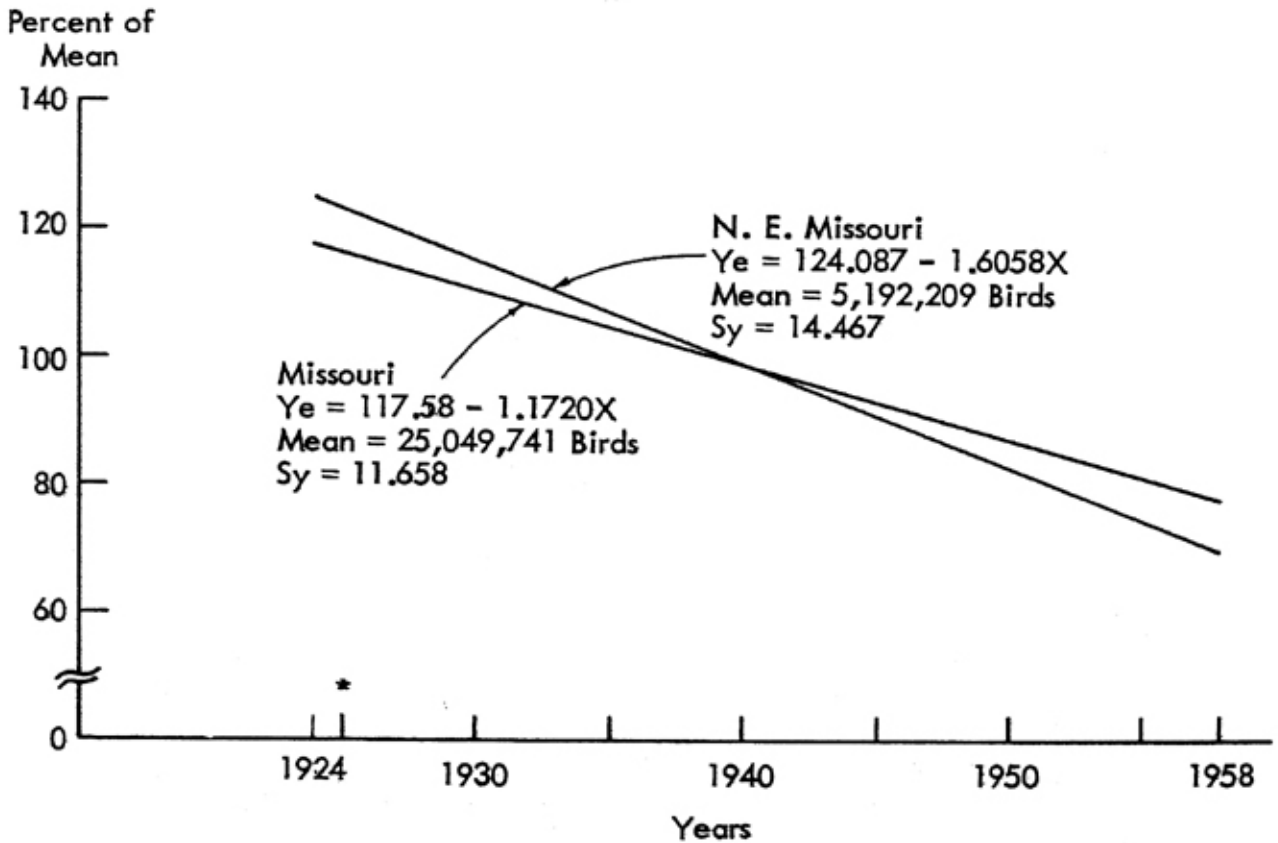
**FIGURE 22  
NUMBER OF SHEEP**



**FIGURE 23**  
**NUMBER OF CHICKENS**



**FIGURE 24**  
**TREND IN NUMBER OF CHICKENS**



## RELATION TO THE INDUSTRY OF THE STATE

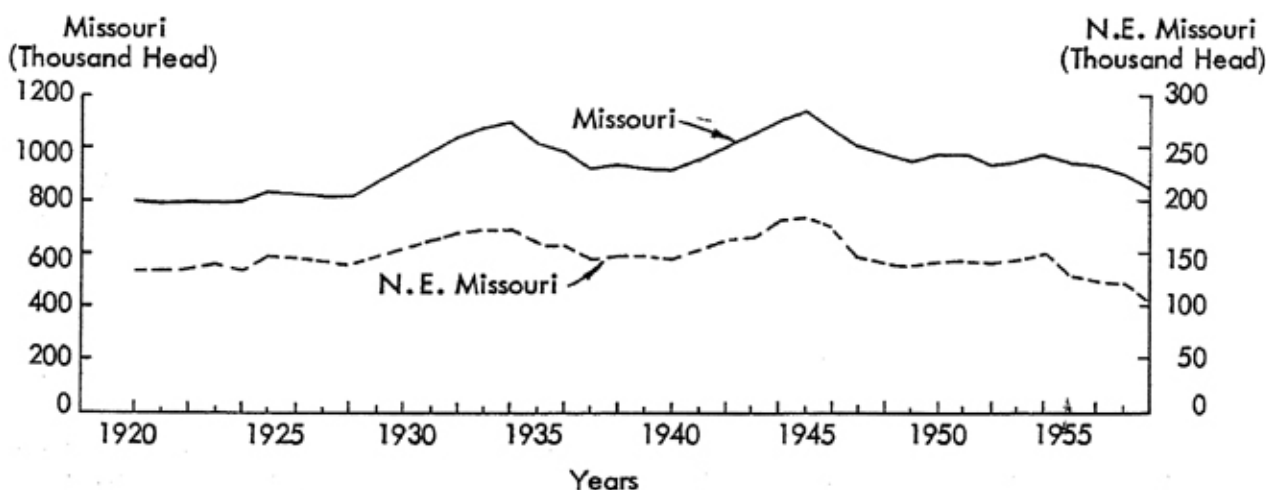
The Northeast area has suffered a decrease in population. Despite this retarding effect, the number of milk cows has increased.

### Cow Numbers

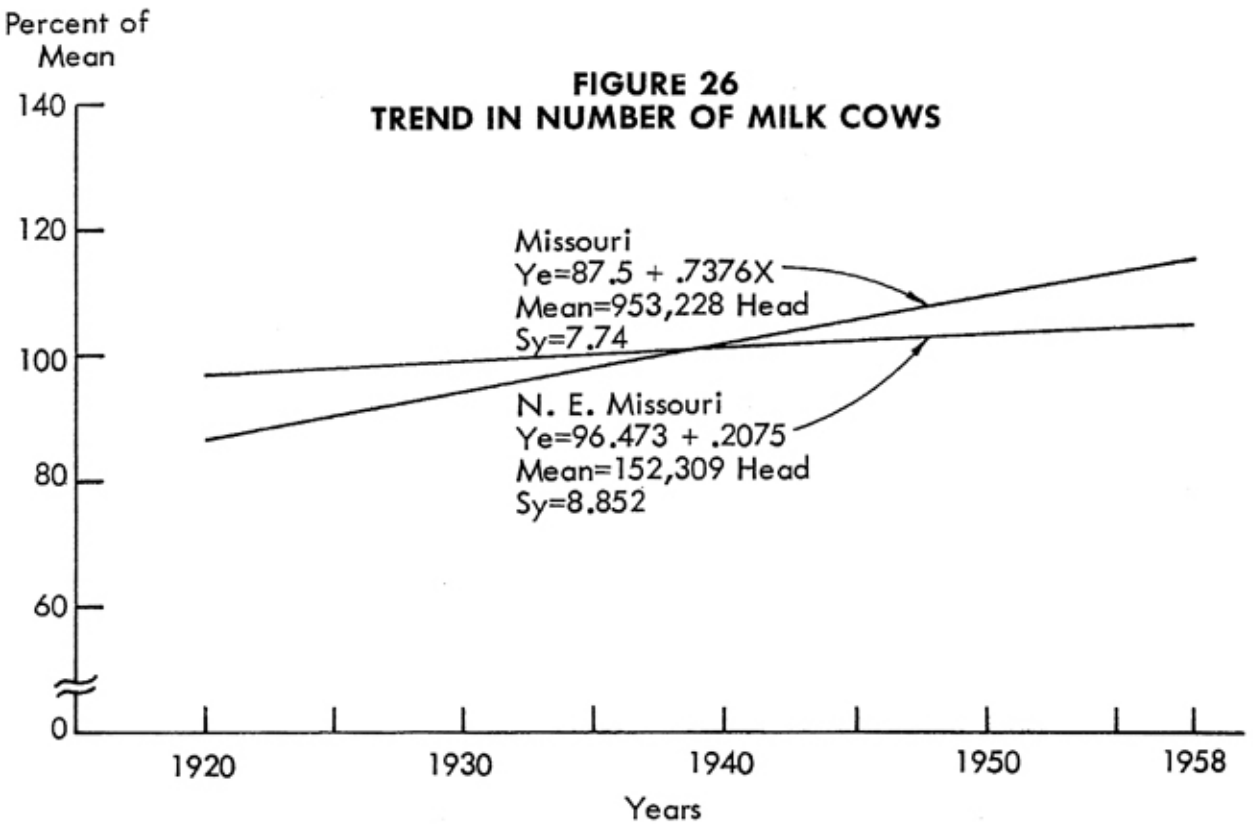
In 1920 there were 135,000 head of milk cows in the area (Figure 25). This was about 17 percent of the 800,000 head in the state. Milk cow numbers increased both in the area and in the state during the depression years due primarily to the favorable economic position of dairying compared to other farm enterprises. Another increase in number of milk cows occurred in both the area and the state during the years of World War II when milk production was subsidized by the government and there were fewer products competing for the consumer dollar.

The number of milk cows in the area increased slightly from 1920 to 1954 but at a much lower rate than in the state as a whole (Figure 26). The percentage of Missouri milk cows located in the Northeast area has tended to decline during the period 1920-1957 (Figure 27). An exception to this general trend occurred during the World War II period. During this time St. Louis milk consumption was expanding rapidly. Due to the tire and gasoline shortage it was necessary to secure as much of this increased consumption as possible nearby. Milk production in surrounding areas was encouraged and this probably had a great deal to do with the increased number of milk cows in the area at this time. As soon as the government subsidy on milk production was removed, the percentage of Missouri milk cows in the area declined drastically and resumed the long time decline. Less than 13 percent of Missouri's milk cows were

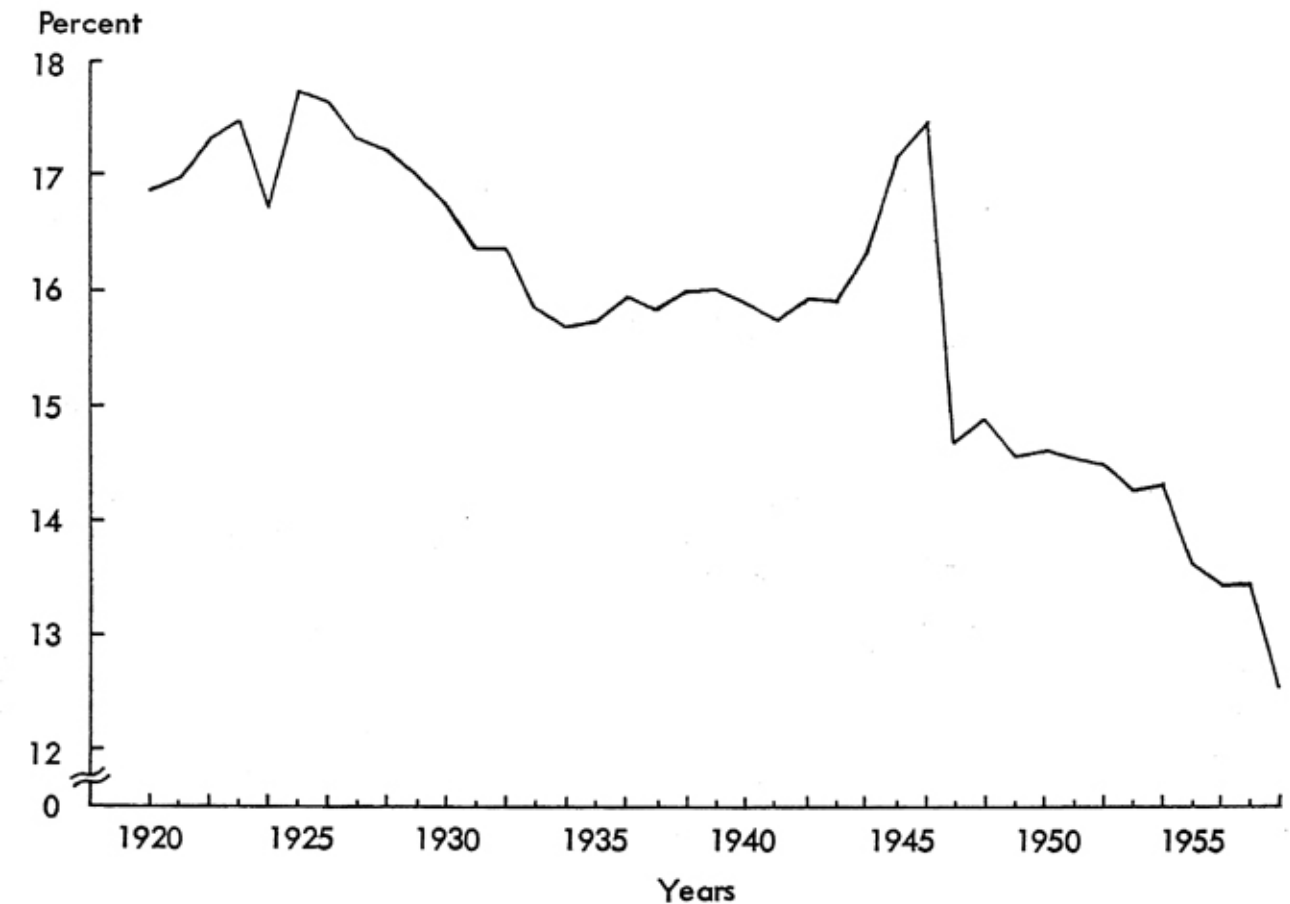
**FIGURE 25**  
**NUMBER OF MILK COWS**



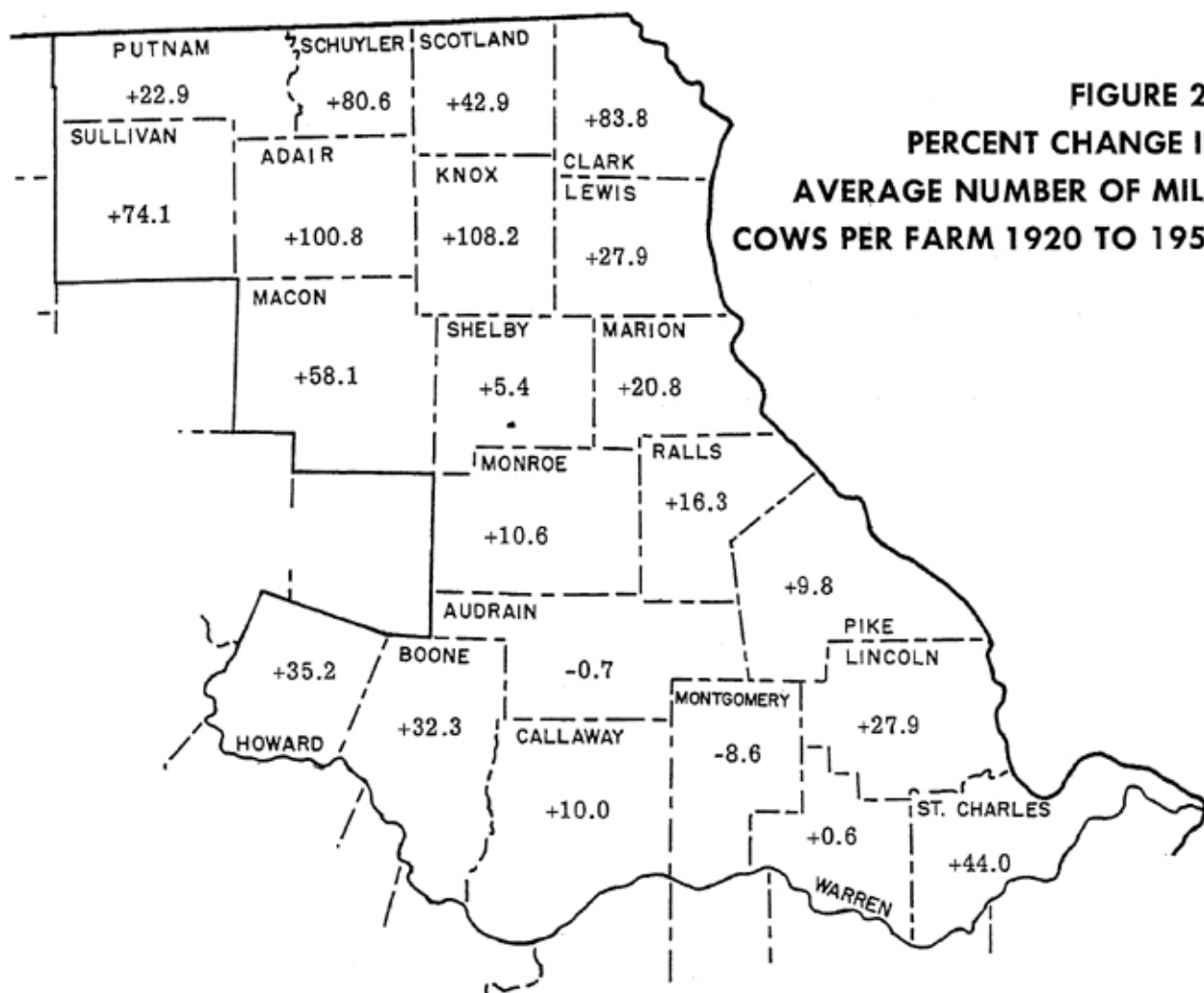
**FIGURE 26**  
**TREND IN NUMBER OF MILK COWS**



**FIGURE 27**  
**PERCENTAGE OF MISSOURI'S MILK COWS LOCATED IN NORTHEAST AREA**



**FIGURE 28**  
**PERCENT CHANGE IN**  
**AVERAGE NUMBER OF MILK**  
**COWS PER FARM 1920 TO 1950**



located in the Northeast area in 1958. As in other parts of the United States, the number of milk cows per farm has been increasing in this area (Figure 28).

Figure 29 shows the concentration of milk cows within the area.

### Milk Production per Cow

Data are not available by counties on production per cow. However, to compare the area with the state, the total quantity of milk produced in the 22 northeast counties during 1940 and 1945 was divided by the number of milk cows in those counties to get average production per cow. The 1950 and 1954 censuses recorded only the quantity of milk produced on the day preceding the enumeration and the number of cows milked on that day. Data for 1940 and 1950 are not directly comparable but the relationship between the area and the state can be used (Table 3). Production per cow is lower in the area than in the state.

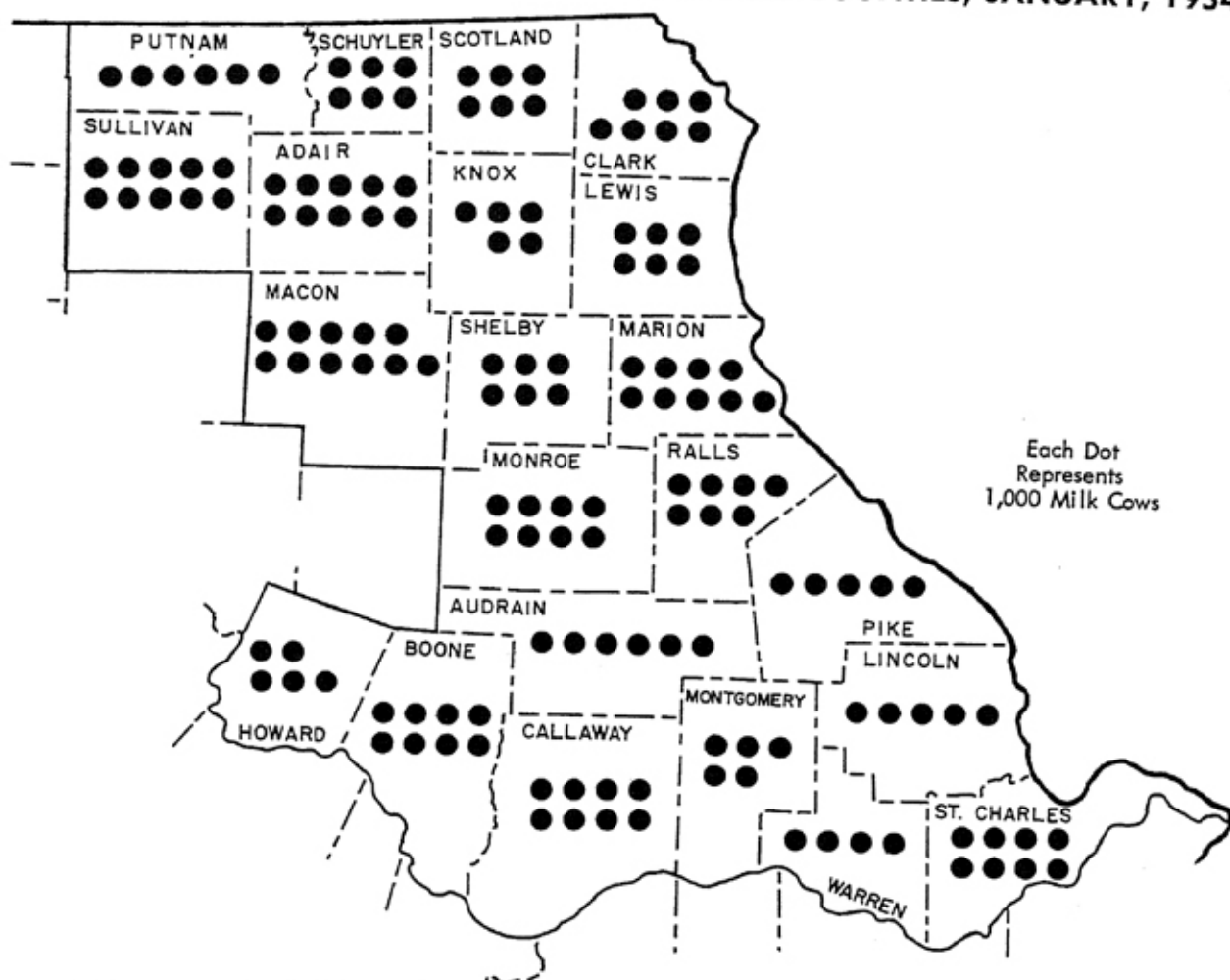
**TABLE 3. MILK PRODUCTION PER COW**

Percent Missouri Average  
 Production per cow was above  
 Northeast.

Year	Percent Missouri Average Production per cow was above Northeast.
1940	4.0
1945	3.5
1950	6.3
1954	5.1



FIGURE 29—MILK COWS IN NORTHEAST MISSOURI COUNTIES, JANUARY, 1954.



Fifteen percent of Missouri cows were located in the area in 1954 but only 10 percent of the Missouri dairy income was received by the area's dairymen.

This is a further indication of the relatively minor position the dairy cow holds among farm enterprises in Northeast area. The only production requirement imposed on the cows in many cases is to meet the family needs for fresh milk and butter. Dairying in many parts of the area is not commercialized and little effort has been put forth to improve the quality of dairy animals. With other sections of the state making improvements in their breeding selections and feeding practices, Northeast Missouri has fallen behind in the rate of production.

#### Farm Income from Dairy Enterprises

Farmers of the Northeast area have not depended on dairying for much income. It has been used to supplement their cash grain or livestock fattening systems. The area derived 8.6 percent of its total farm income from dairying in 1939 (Table 4). This percentage decreased from 1939 to 1954. Statewide, during the same years, dairying contributed from 11 to 13 percent of the cash farm income.

TABLE 4. RELATION OF DAIRY INCOME IN NORTHEAST MISSOURI TO TOTAL FARM INCOME IN THAT AREA AND TO TOTAL DAIRY INCOME IN MISSOURI, 1939, 1944, 1949, and 1954.<sup>1</sup>

Area	Year			
	1939	1944	1949	1954
<b>NORTHEAST MISSOURI:</b>				
All Farm Products Sold (dollars)	39,888,916	90,479,111	135,751,671	147,399,025
Income From Sale of Dairy Products (dollars)	3,445,117	7,776,508	9,315,177	8,574,779
Percent of Income From Dairy Products	8.64	8.59	6.86	5.82
<b>MISSOURI:</b>				
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
Percent of Income From Dairy Products	11.35	12.93	11.01	11.48
Dairy Income in Northeast Missouri as a Percent of State Total From Dairy	14.14	11.88	11.75	10.18
1U. S. Census of Agriculture.				

Calves, and cows culled from the dairy herds make sizeable contributions to the income of farmers in this area. Returns from these sources appear as income from livestock and are not credited to the dairy enterprise in census data.

Income from dairying has been more stable than income from other sources. Since 1920 the farm price of milk has fluctuated between \$1.07 and \$4.86 per cwt., a variation of 354 percent from low to high. Corn prices have varied 575 percent and wheat prices, 503 percent in this same period. Variation in the milk-feed, hog-corn and beef-corn ratios were also used as a measure of stability of income in the three enterprises. An average for the 30 year period 1924-1953 was calculated for each of the three ratios; then the high and the low were compared with the average. When this was done, the milk-feed ratio varied from a low of 87 to a high of 113, a difference of 26 points. The hog-corn ratio varied from a low of 56 to a high of 137, a difference of 81, and the beef-corn ratio varied from a high 148 to a low 66 with a difference of 82. The variations in the hog-corn and the beef-corn ratios were more than three times as much as that in the milk-feed ratio.

## CHARACTERISTICS OF THE AREA MILK SUPPLY

### Seasonality of Production

Breeding and feeding practices in Missouri and the Northeast area are such that milk production increases during the spring and summer months. This heavy spring and summer production is one of the serious problems facing the dairy industry.

Consumption of dairy products is relatively constant during the year. Thus, if a high percentage of production is concentrated in a short period, the product must be stored. This storage means extra cost to the processor and/or decreased price to the producer. In addition to storage costs, the costs of maintaining excess manufacturing capacity must also be considered.

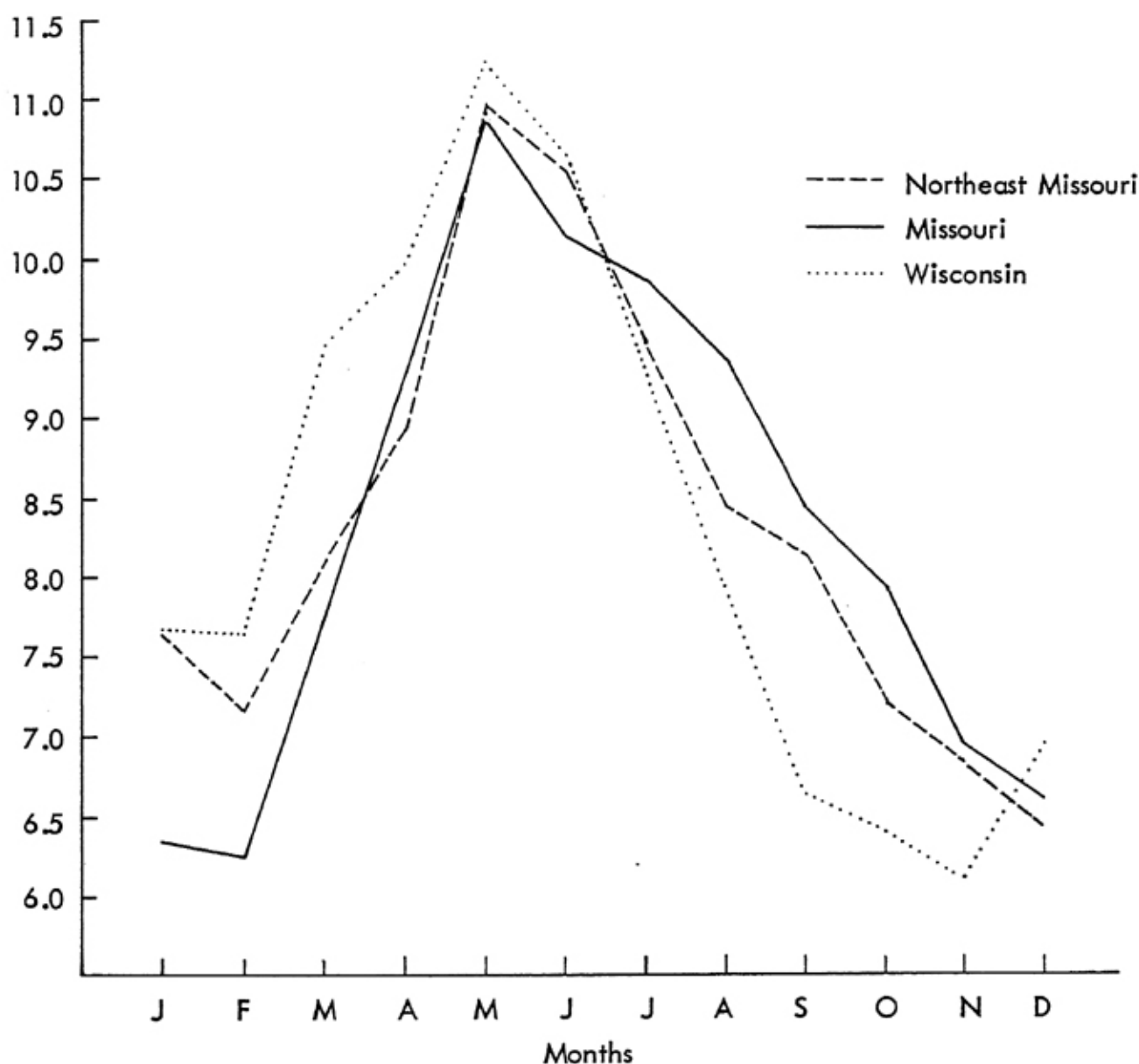
The variation in annual production in the Northeast area is greater than in the state as a whole. The grazing season is shorter in the Northeast area than in the southeast or southwest parts of the state. This causes dairy farmers in the Northeast to feed winter rations earlier in the fall and later in the spring. Also, there are many farmers in the Northeast area who do not practice fall freshening. This difference in feeding practices plus poorly balanced breeding systems, means a greater proportion of annual production will be marketed in the spring and summer months.

Figure 30 gives the average percentage of the yearly total received each month at eight plants from which complete data were obtained in the Northeast area during 1954. Forty percent of the total milk was received in the four months of April through July. During the last one-third of the year only 28 percent of the yearly total was received.

Monthly receipts of whole milk varied considerably among plants within the Northeast area. In January the range was from 5.4 percent at one plant to 9 percent at another. The widest variation occurred in July, when one plant received 11 percent of its yearly total and another received 7 percent.

A couple of plants within the Northeast area reported using programs similar to one used in the Kansas City market in an attempt to get their producers to become conscious of seasonal production. This system involves taking away a certain amount of the milk check in the spring, say 40¢ per cwt. during the months of high production, April, May, June and July. This fund is held in escrow and paid back to the producers according to their deliveries during the months of low production, October, November, and December. This has the effect of lowering the price in the spring and raising it in the fall, and encourages more even seasonal production.

**FIGURE 30**  
**PERCENT OF ANNUAL MILK PRODUCTION RECEIVED EACH MONTH, 1954**



Receipts at the plants in the area which purchase cream closely followed the pattern for monthly receipts of milk. Receipts were usually lowest in the first two months of the year. June was the high month with May to September, inclusive, accounting for more than 50 percent of annual cream marketings.

#### Butterfat Content

Butterfat content of milk produced in the Northeast area during 1955 averaged 4.18 percent which was about the same as the state average of 4.15 percent during the same period (Table 5). Jerseys and Guernseys are the principal breeds of cattle milked. Many farmers in the area sell their milk on a butterfat basis.

TABLE 5. AVERAGE ANNUAL BUTTERFAT TEST OF MILK, NORTHEAST MISSOURI, MISSOURI, WISCONSIN, SOUTHCENTRAL STATES AND THE UNITED STATES, 1955.<sup>1</sup>

	Butterfat Test (percent)
Northeast Missouri <sup>2</sup>	4.18
Missouri	4.15
Wisconsin	3.65
Southcentral States	4.28
United States	3.86

<sup>1</sup>U.S.D.A., Farm Production, Disposition and Income from milk, 1954-1955.

<sup>2</sup>Simple average for the receipts of all plants in the area.

The continuation of this practice has not encouraged a change to other breeds of cattle.

Plants in the area which bought milk for manufacturing reported a higher butterfat content than the plants which bought milk for sale in fluid form. The plant with the highest test averaged 1.2 percent higher than the plant with the lowest.

### Quality of the Farm Product

Producers of milk for the fluid market have a greater obligation to follow sanitary practices than producers of manufacturing milk. To produce milk for the fluid trade requires a large investment in buildings and equipment, a knowledge of procedures for producing a high quality product and greater care in handling the milk.

In the Northeast area little information could be obtained on the amount of milk rejected at each plant. These records are kept only long enough to make payment to the producer; in a few instances the manager had retained these rejection sheets for three or four weeks. However, most managers did know how many cans or pounds were rejected by the state inspector on his monthly visit to the plant.

The inspector rejected only about 2 percent of the milk due to sediment during his visits to plants where manufacturing milk was processed. Those processors who bought from Grade A producers had even less rejected, probably due to the fact that the milk was more carefully handled.

In the early summer many firms reported rejections due to souring. Some farmers do not begin to cool their milk in the spring until they have had a can of sour milk returned. There were more rejections at the plants which bought milk for manufacturing than at those which bought market milk. A lower percentage of the manufacturing milk producers had coolers; thus their milk would sour more quickly while in transit than that which had been cooled prior to loading. About the only rejections due to souring experienced by Grade A shippers was when a producer had failed to turn on his cooler early in the summer. Those dealers purchasing milk from farmers who owned coolers had very few rejections.

The most important source of rejection of manufacturing milk, other than sediment, was off-flavor milk. When cows are turned on new green pasture in the spring, the flavor of the milk changes. Plant operators reported milk rejected because cows had eaten green wheat pasture or onions. Even this rejection was less than 1 percent of total milk receipts.

### Milk and Cream Prices.

The price received for his produce is a primary consideration when a producer is selecting his agricultural enterprises. When costs are compared with prices received, those combinations of enterprises will be chosen which will yield him the greatest net return.

Since the demand for fluid milk is fairly stable seasonally, there should be a relatively even supply on the market during the year. This means that a large portion of the herd should freshen in the fall and winter months, and that these cows should be better fed to maintain their milk flow. The differential for fluid milk over manufacturing milk usually takes this extra expense into consideration. Also, the price paid for milk must be maintained at a competitive level with other types of products which may be produced with farmers' resources. If the price is too low, not enough milk will be produced; if it is too high too much milk will be produced.

The price of milk for manufacturing purposes is, in most cases, based on the butterfat content. Table 6 compares prices for plants buying milk for manu-

TABLE 6. PRICES PAID FOR MANUFACTURING MILK, NORTHEAST MISSOURI AND MISSOURI; SELECTED MONTHS, 1952, 1954.

	February		April		June		October	
	1952	1954	1952	1954	1952	1954	1952	1954
	(price per hundred weight) 4% test							
High	\$4.09	\$3.60	\$4.00	\$3.28	\$4.00	\$3.28	\$4.06	\$3.28
Low	3.48	3.00	3.44	2.64	3.27	2.66	3.40	2.76
Weighted								
Average	3.87	3.21	3.58	2.80	3.45	2.76	3.86	2.98
Average Missouri								
Price <sup>1</sup>	4.36	3.32	4.16	3.20	4.24	2.88	4.00	3.04

<sup>1</sup>Missouri Farm Products Prices, Office of the Agricultural Statistician, Box 30, Columbia, Missouri.

facturing purposes, during selected months, 1952 and 1954, with average Missouri manufacturing prices for the same periods. Plants located some distance from St. Louis paid lower prices but no one plant consistently paid the lowest or highest price. The Missouri average price was more than that paid by the highest plant in the area several months and higher than the average for all plants every month. This may give a clue as to why the cow population fell off so rapidly in Northeast Missouri when the subsidy was discontinued at the close of World War II.

Most Grade A dairy plants in the area paid the St. Louis blend price minus

a sum which was approximately equal to the cost of transporting milk to St. Louis.

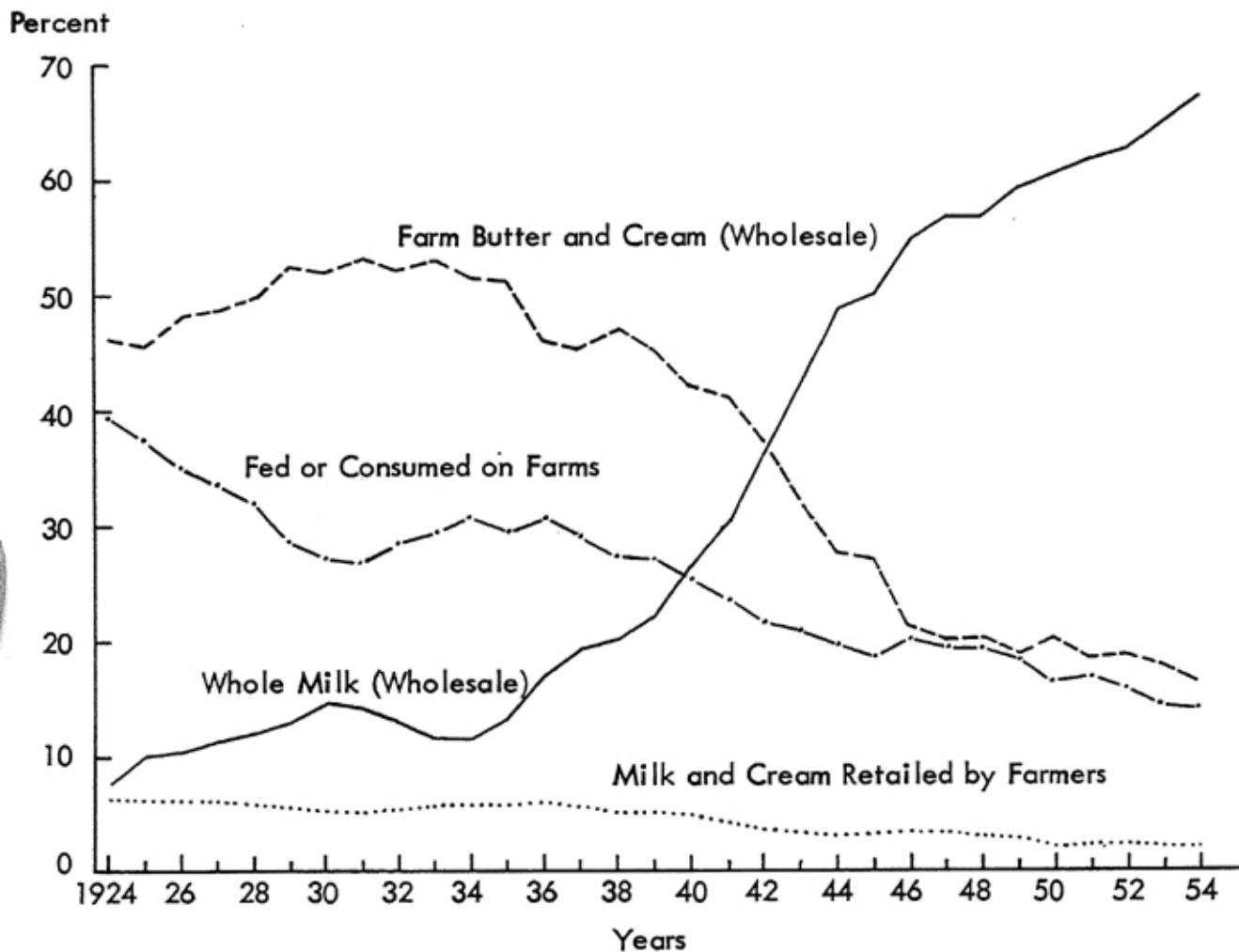
Nine plants in the area reported they bought cream, but only two of these purchased cream to be processed in the plant where it was delivered. The remaining seven plants were primarily receiving stations for cream which was to be reshipped.

Prices of cream usually were based on the price of a particular score of butter on the Chicago market or on the price paid for cream by one of the larger processing plants minus transportation costs to that plant.

### Disposition of Milk.

In 1924, most of the milk produced in Missouri either was consumed on the farm or sold wholesale as farm butter or cream (Figure 31). This type of marketing prevailed until the early 1930's. In 1954, only 14 percent of the milk was

**FIGURE 31**  
**DISPOSITION OF MILK PRODUCED IN MISSOURI**





consumed or fed on the farm and only 17 percent was sold as butter or cream. Table 7 shows the disposition of milk for the Northeast area during the years 1939, 1944, 1949, and 1954. Sales of whole milk have tended to increase while sales of cream have tended to decrease. Note that the area has not shifted from the sale of cream to the sale of whole milk as rapidly as the state. A further comparison could be made with the Southwest area of the state, which has made a much more rapid change.

**TABLE 7. MILK AND CREAM SALES IN NORTHEAST MISSOURI, SOUTHWEST MISSOURI AND MISSOURI, 1939, 1944, 1949 and 1954.<sup>1</sup>**

	Year			
	1939	1944	1949	1954
<b>NORTHEAST MISSOURI:</b>				
Sales of Whole Milk (1,000 pounds)	90,770	150,497	162,267	184,198
Sale of Cream, Butterfat (1,000 pounds)	6,700	5,951	5,920	4,657
Whole Milk as a Percent of Total Sales <sup>2</sup>	35.1	50.3	52.3	61.3
Cream as a Percent of Total Sales	64.9	49.7	47.7	38.7
<b>SOUTHWEST MISSOURI:</b>				
Sales of Whole Milk (1,000 pounds)	425,588	800,231	1,008,401	1,219,187
Sales of Cream, Butterfat (1,000 pounds)	8,900	5,866	1,839	465
Whole Milk as a Percent of Total Sales <sup>2</sup>	65.7	84.5	95.6	99.06
Cream as a Percent of Total Sales	34.3	15.5	4.4	.94
<b>MISSOURI:</b>				
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 <sup>2</sup>	47.3	67.8	74.2	84.9
Cream as a Percent of Total Sales	52.7	32.2	25.8	15.1

<sup>1</sup>U. S. Census of Agriculture.

<sup>2</sup>Cream sales converted to milk on basis of 4 percent butterfat content and added to whole milk sales to give total sales.

## MARKETS FOR PRODUCTS

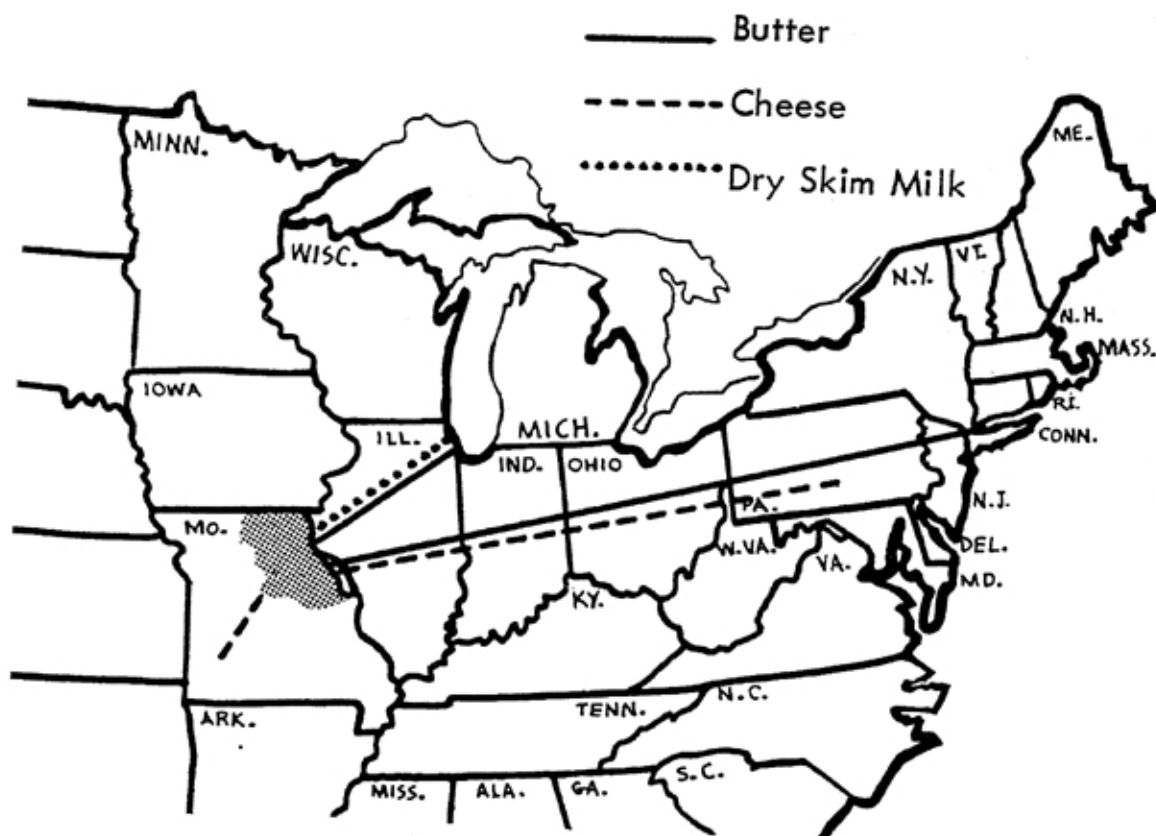
Plants in the Northeast area are all owned by local persons or organizations. Shipment of dairy products out of the area is determined by the demand made on the output by local consumers. Most of the dairy products are consumed locally. There is some movement of products within the state and small quantities are put on the national market.

### Butter.

Most of the cream is bought by plants that reship to other processing points but some is manufactured into butter in the area. A large part of this butter goes to Chicago and St. Louis (Figure 32). New York was a principal market for one plant. Much of this butter was being moved into storage under the federal government price support program. For this reason the record of shipments may not indicate the normal pattern of distribution.

FIGURE 32

### DAIRY PRODUCT MOVEMENT FROM NORTHEAST MISSOURI, AUGUST, 1955



### Cheese.

American cheese was being produced by only two plants in the Northeast area. By 1955 these plants had been in operation for at least 20 years and had been producing cheese for at least 15 years.

Plants that buy most of the cheese output of the area are located at Springfield, Mo. They produce principally blended cheese. Part of the local output is sold to a Pennsylvania corporation that has distribution systems in Michigan and Minnesota (Figure 32).

### Ice Cream.

Ice-cream is a manufactured dairy product produced in considerable volume. Most of the ice cream was sold in the community where produced. That which was sold outside the area was produced by a company which maintained distribution systems throughout north Missouri.

One firm was organized to supply mix for the soft ice milk industry of north Missouri. This organization delivered mix to all of the soft ice milk retail outlets that were organized under a particular brand name. It reported that most of its sales were north of the Missouri River.

### Fluid Milk.

Most of the milk produced in the Northeast area for fluid use was consumed close to the point of production. However, St. Louis drew some milk from the area, and provided a large volume market. Missouri has increased in importance as a supplier of fluid milk for St. Louis, but the Northeast area has been decreasing its sales to this market. In 1949 more than 300 producers in the area were delivering milk to the St. Louis market from the area. By 1955 the number had decreased to 197.

However, St. Louis exerts considerable influence on milk marketing in the area. Producer prices in the small local markets must be comparable to those of the St. Louis market or processors will experience decreasing supplies. The paper bottle innovation has made it possible to distribute the bottled product over a much larger area than previously. This improved technology also has made local processors conform more closely to the prices and policies established by the firms in larger cities.

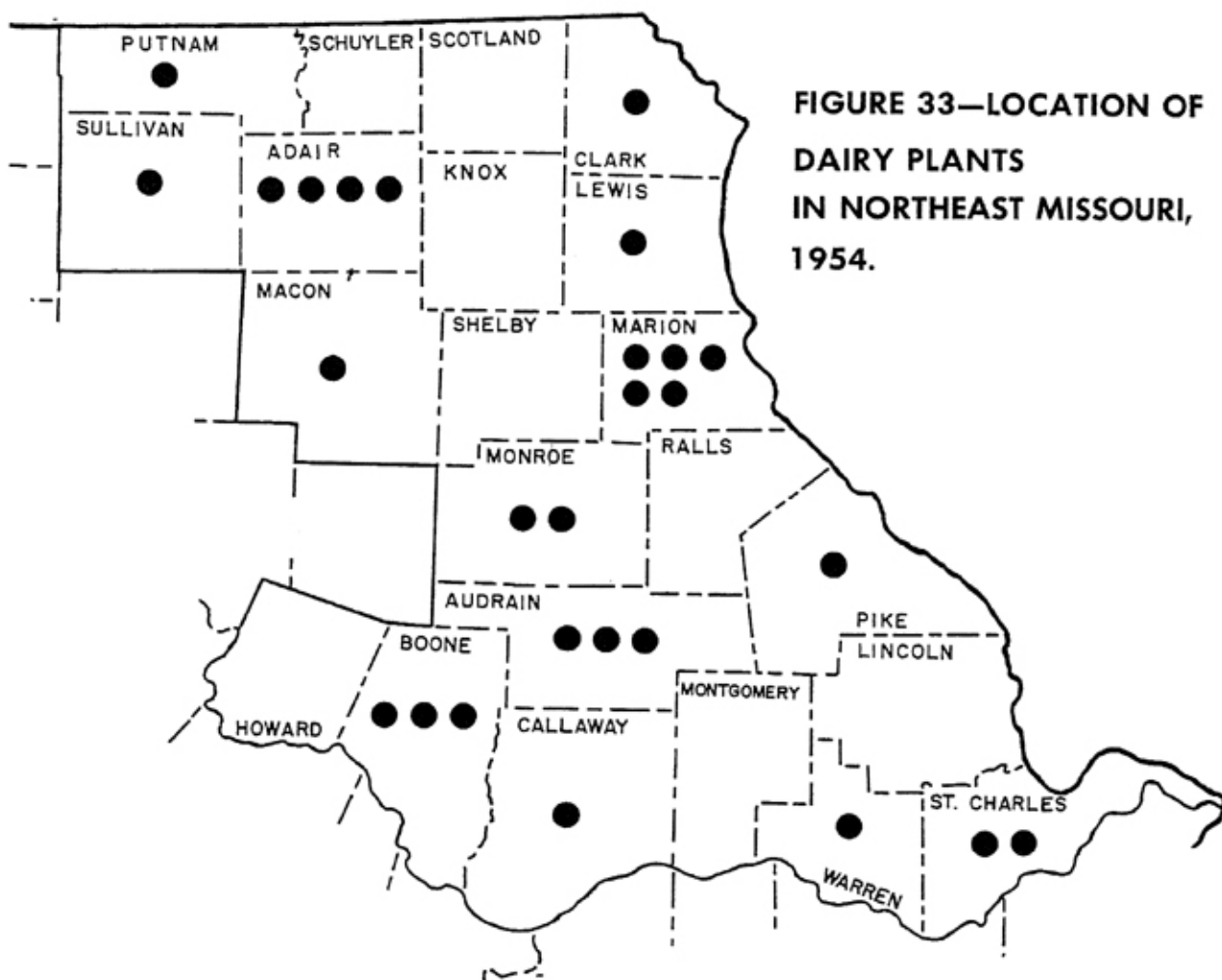
## EXISTING PLANTS

One of the purposes of this study was to determine the adequacy of the milk outlets available to farmers. Unless the product can be made available to the consumer, production efforts are useless.

### Capacity.

The 27 plants in the area ranged from one room milk receiving and bottling stations, to some which were equipped with the most modern machinery (Figure 33). Some were processing the production of a single farm; others produced and distributed their products in a local village while still others produced for a national market. The most prevalent type of plant in the area was the local processor, producing for local trade.

Plant capacity figures were based on managers' estimates of the maximum quantity of milk or cream they could handle and the quantity of the various products they could produce from this milk or cream in an eight hour working day.



**FIGURE 33—LOCATION OF DAIRY PLANTS IN NORTHEAST MISSOURI, 1954.**

Some managers arrived at this figure by giving data on the actual milk or cream they handled when in full capacity. Others estimated their maximum capacity from the size of their holding vats and their homogenizing, pasteurizing, and bottling machines.

A summary of the estimated maximum capacity of milk plants is presented in Figure 34. Estimated maximum capacity of cream plants in the area is summarized in Figure 35. Table 8 shows the total capacity of all plants in the area by

**TABLE 8. ESTIMATED DAILY PRODUCTION CAPACITY OF DAIRY PLANTS<sup>1</sup>.  
NORTHEAST MISSOURI, AUGUST, 1955.**

Product	Amount of Product
Milk for Bottling	216,157 pounds
Cheese (including cottage cheese)	11,182 pounds
Ice Cream	6,415 gallons
Butter	23,566 pounds

<sup>1</sup>Daily capacity is based on an eight hour working day.

product. The total capacity of all the plants in the area is approximately 850,000 pounds of milk per day whether figured on the basis of milk equivalent of the product or on the basis of the milk and cream which could be received. If we assume 308 working days in a year, this would give a total annual capacity of 261,800,000 pounds of milk. When milk and cream sales for the area (Table 7) are converted to milk equivalent and added, it is seen that farm sales exceed plant capacity by nearly 20 percent. The excess is sold outside the area, mostly to the St. Louis market.

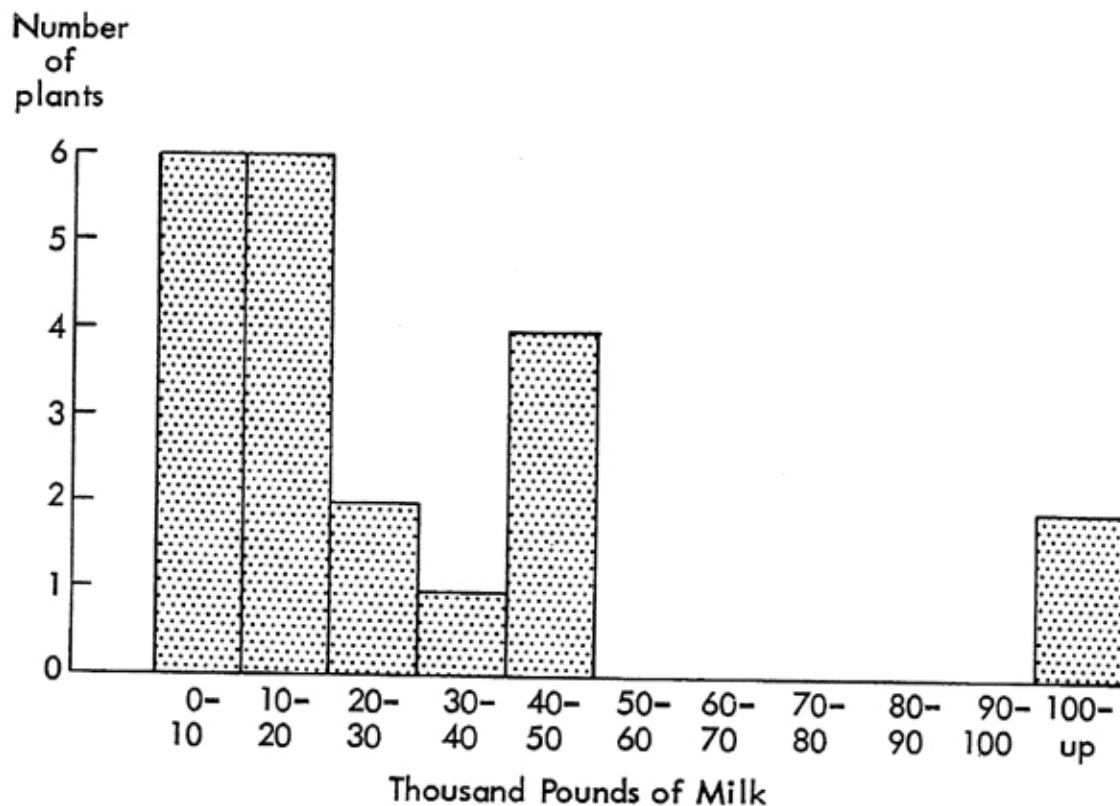
### Ownership.

All of the 27 plants in the Northeast area were owned by local people (Table 9).

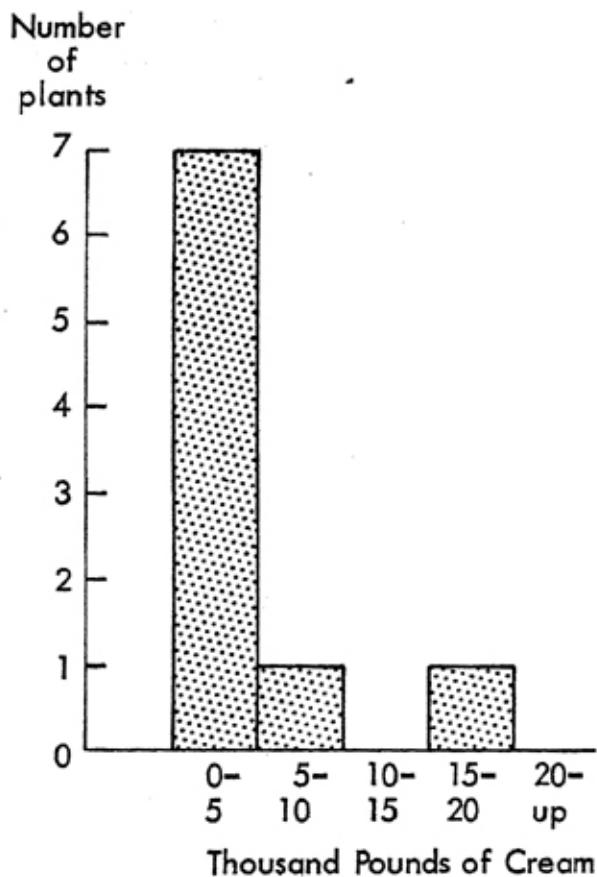
**TABLE 9. TYPE OF OWNERSHIP OF DAIRY PLANTS IN NORTHEAST  
MISSOURI, AUGUST, 1955.**

Ownership	Number of Plants
Local Proprietor or Partnership	14
Local Corporation	11
Farmer Cooperative	2
Total	27

**FIGURE 34**  
**ESTIMATED MAXIMUM CAPACITY OF MILK PLANTS IN NORTHEAST**  
**MISSOURI, AUGUST 1955**



**FIGURE 35**  
**ESTIMATED MAXIMUM CAPACITY OF CREAM PLANTS IN THE AREA,**  
**AUGUST, 1955**



## NORTHEAST MISSOURI COMPARED WITH STATE TOTALS, 1956

	Northeast Missouri	Missouri	Percent Northeast Missouri was of State
Land Area (acres)	7,957,120	44,304,640	18
Land in Farms (acres)	6,913,659	34,195,379	20
Farms (number)	34,959	201,614	17
Population (1950)	345,237	3,954,653	9
Rural Population (1950)	231,411	1,521,938	15
Corn (acres)	969,000	3,946,000	25
Wheat (acres)	344,000	1,660,000	21
Tame Hay (acres)	561,000	2,710,000	21
Soybeans (acres)	714,000	1,956,000	37
Beef Cattle (number)	648,000	3,091,000	21
Hogs (number)	968,000	3,819,000	25
Sheep (number)	275,000	749,000	37
Chickens, Excluding Broilers (number)	3,172,000	14,555,000	22
Milk Cows (number)	126,000	936,000	13
Income From all Farm Products Sold, 1954, (dollars)	147,399,025	733,733,793	20
Income From Sale of Dairy Products, 1954, (dollars)	8,574,779	84,202,959	10