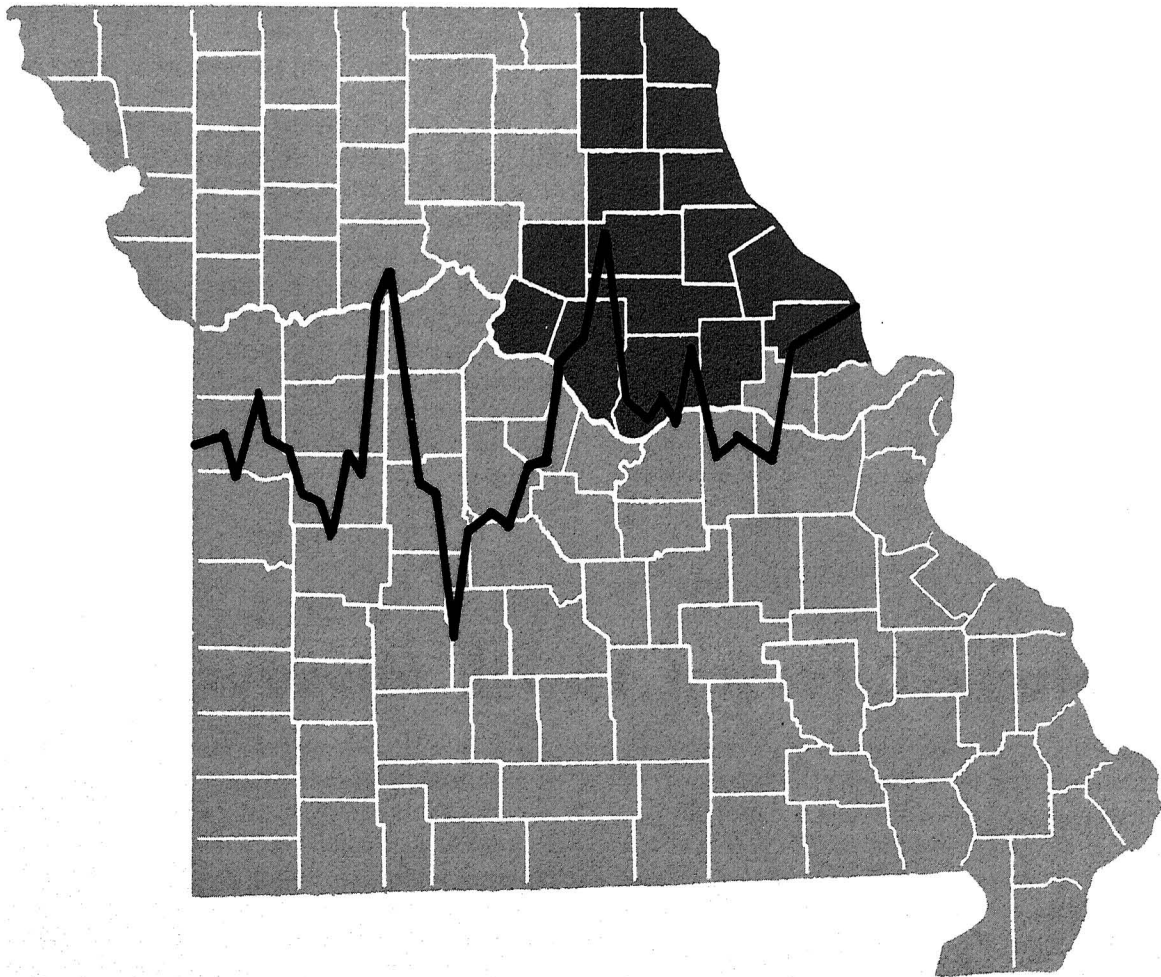


# **NORTHEASTERN MISSOURI AGRICULTURE**

**Trends      Adjustments      Potentials**



**SB-840    3/66    3.5M**  
**University of Missouri**  
**Agricultural Experiment Station**

# NORTHEASTERN MISSOURI AGRICULTURE

## Trends Adjustments Potentials

CURTIS BRASCHLER AND OSMO PASANEN

Farmers, businessmen, extension workers, and other people concerned with public and private decision making have become increasingly concerned with the impact of agricultural change on the non-farm economy of rural areas. Change in agriculture has been associated with the general expansion of technology. The development and implementation of new agricultural technology has characterized our society since the early part of the Nineteenth century. However, only within recent years has the development and implementation of agricultural technology had an accentuated impact on the non-farm economy of rural areas.

In 1946, 8.3 million people were employed in farming in the United States. This was 14.5 percent of the total labor force. By 1962 only 5.2 million people were employed in farming and this was only slightly over 7 percent of the total labor force. The decline in farm employment has developed in a period of 15 years into a phenomenon with far reaching social and economic implication for the entire economy.

The release of labor from the production of food to other activities has been an essential element of the advance of technologically oriented civilizations. Such change in the structure of society does not occur without producing related problems.

The economic and technological forces producing change in American agriculture affect different agricultural regions in different ways. The impact these forces will have on a particular area depends on the areas' types of farming, regional specialization, and relative dependence on agriculture.

This publication reviews the results of an analysis of trends in farming in economic area 2b in Northeast Missouri (Figure 1). The purpose of this analysis was to determine and project changes in farming which have or will have a major impact on the economy of the area. This should provide useful guides to public and private decision makers in planning future economic development in area 2b.

## Study Covered 16 NE Missouri Counties

For purposes of economic analysis the United States has been divided by other economics investigators into five economic provinces.<sup>1</sup> An economic province is a rather arbitrary economic classification. The five provinces have been further subdivided into 13 economic regions. The economic regions were further subdivided into state economic areas.

<sup>1</sup>Donald T. Bogue and Calvin L. Beale, *Economic Areas of the United States*, (New York: Free Press of Glencoe, 1961).

State economic area 2b in Missouri is a subsection of Economic Region V (Figure 1). Economic Region V includes the midwest Corn Belt section of the United States. The agricultural economy of Economic Region V produces essentially feed grain, livestock, and soybeans.

Subsection 2b includes 16 counties in Northeast Missouri containing approximately 5.8 million acres or 9,062 square miles (Figure 2). This represents 13 percent of the state's land area but includes only slightly over 6 percent of the population, according to the 1960 Census.

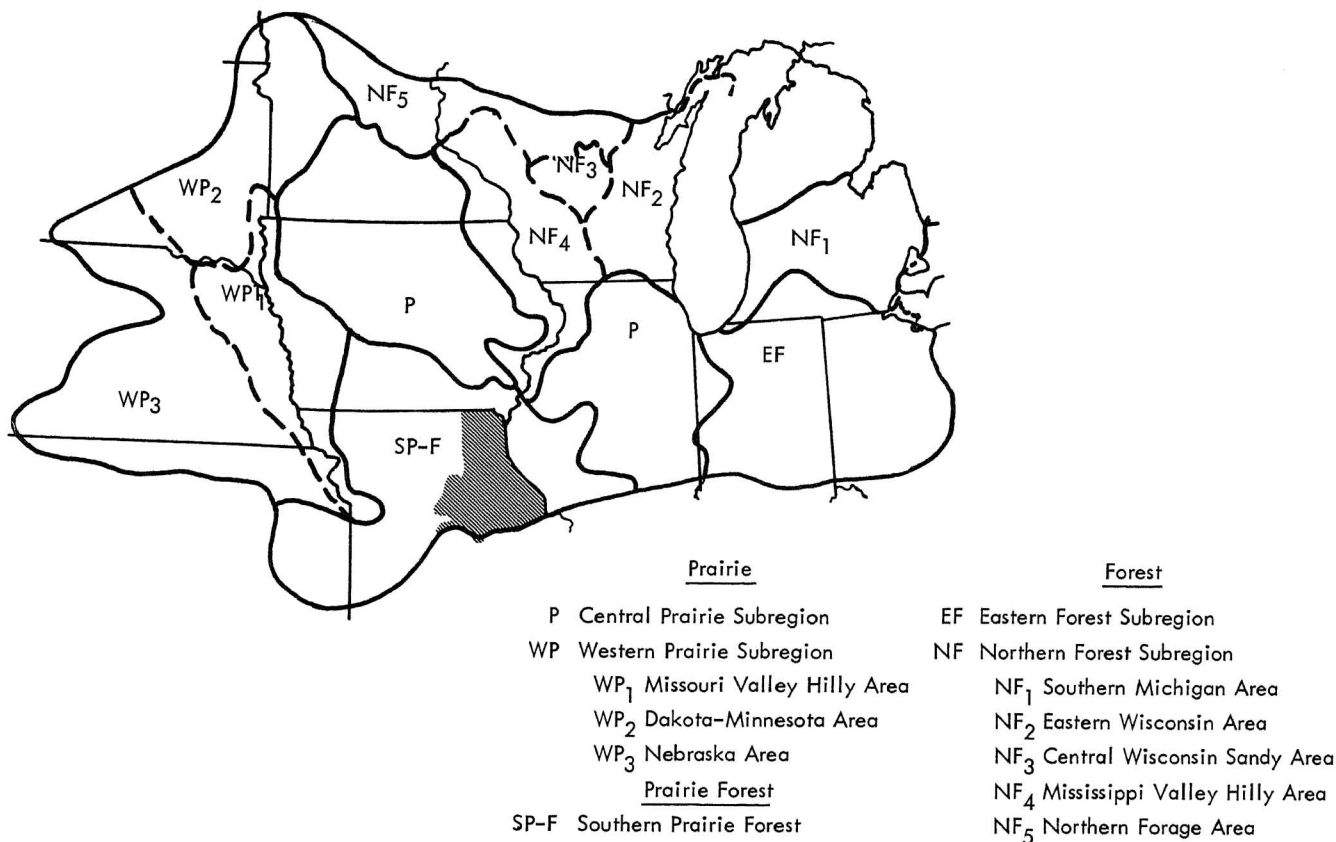


Fig. 1 The United States has been divided into five economic regions for investigation in the field of economics. The area depicted above is Region V. This study was conducted in the subsection, state economic area 2b (shaded area) in northeast Missouri.

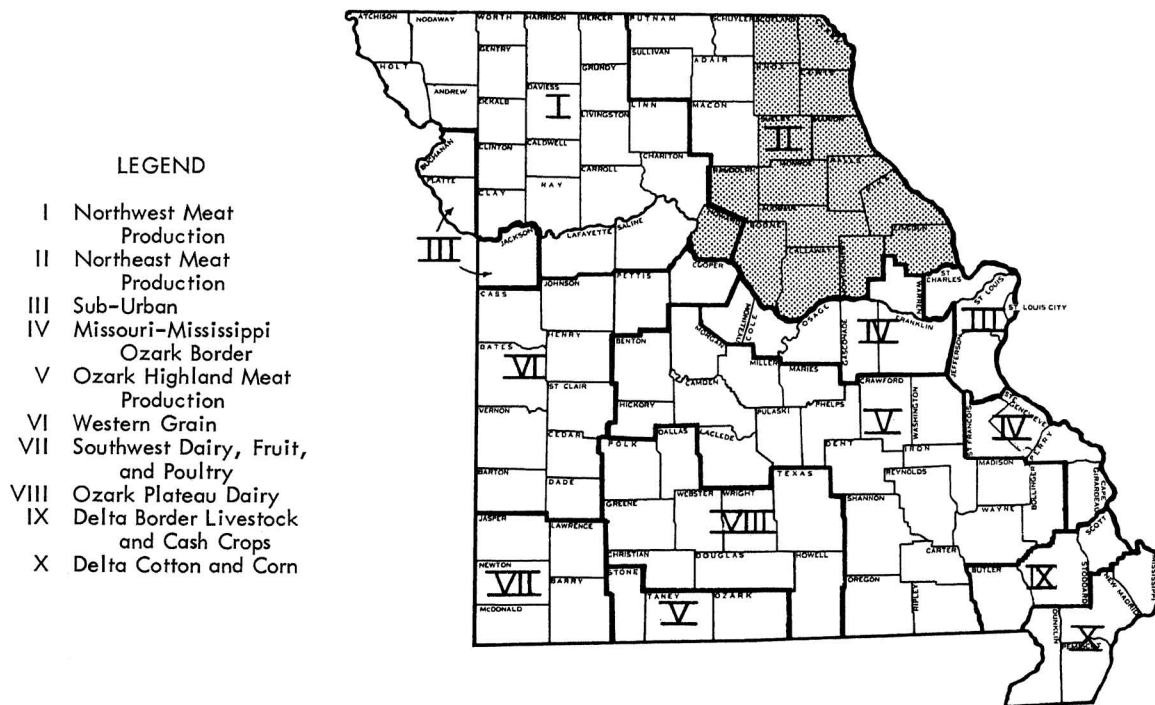


Fig. 2 State economics area 2b (shaded) pictured as a section within Missouri type of farming areas.

# Following Trend to Larger Farms

As in all parts of the nation, the trend to larger farms and fewer numbers has been one of the most obvious trends in area 2b. In 1950 there were approximately 28,000 farms, but by 1959 the number had declined to approximately 22,000 for a percentage decrease of 26 per cent (Table 1). The average size of farm in the area increased from 164 acres in 1939 to 229 acres in 1959.

TABLE 1--BASIC FEATURES OF AGRICULTURE OF STATE ECONOMIC AREA 2b, 1950 AND 1959

	1950	1959
Number of Farms.	27,840	22,060
Land in Farms, Acres.	5,150,768	4,995,471
Cropland Harvested.	1,958,080	2,213,889
Percent of Land Area in Farms.	88.8	86.1
Percent of Land Area in Cropland.	49.7	51.3
Percent of Farmland in Cropland.	55.9	59.3
Percent of Farmland Pastured.	46.4	39.6
Percent of Farmland in Woodland.	17.6	12.4
Percent of Number of Farms in SEA 2b of Total Number to Farms in Missouri.	12.1	13.1
Percent of Land in Farms in SEA 2b of Total Land in Farms in Missouri.	14.7	15.1
Percent of Cropland in SEA 2b Harvested of Total Cropland Harvested in Missouri.	15.9	18.2

TABLE 2--TRENDS IN CROP PRODUCTION AND ACREAGES 1950-1959 STATE ECONOMIC AREA 2b  
AND YIELD CHANGE 1939-59

Crop	Acreage		Percent Change In Acreage 1950-1959	Yield Per Acre		Percent Change In Yield 1939-1959
	1950	1959		1939	1959	
Corn	680,150	865,831	27.3	32.3	52.1	61.3
Soybeans	267,078	576,354	115.8	14.1	20.5	45.6
Wheat	266,394	260,001	-2.4	16.2	26.0	60.2
Sorghum	10,022	42,373	322.8	24.6	43.3	75.7
Oats	202,189	78,854	-61.0	23.3	23.3	0.0
Hay	443,404	344,525	-22.3	1.06	1.70	60.6
Pasture	2,389,956	1,978,206	-17.2			
Total Acreage Crops	1,425,833	1,823,413				
Total Acreage Hay and Pasture	<u>2,833,360</u>	<u>2,322,731</u>				
Total Acreage In Crops, Hay and Pasture	4,259,193	4,146,144				

Eighty-six percent of the land area was in farms in 1959 and this represented only a slight decline from 1950 (Table 2). There was an acreage and a percentage increase in cropland from 1950 to 1959 (Table 1).

Several major developments in land utilization, crop production and acreage yields were important to the agriculture of the area during the decade from 1950 to 1959.

There was a general shift of land use from small grain, hay, and pasture to row crop production (Table 2). Corn acreage increased 27.3 percent and soybean acreage, 115.8 percent, during the decade from 1950 to 1959 (Table 2). During the same period acreage in hay decreased 22.3 percent and pasture, 17.2 percent (Table 2).

## Hog and Beef Numbers Up; Dairy and Sheep Down

A number of important trends in the livestock farming of economic area 2b were noted during the decade from 1950 to 1959. Hog production increased 58 percent; cattle and calf production increased almost 40 percent (Table 3).

During the decade of the 50's dairy cattle on farms declined by almost 50 percent (Table 3). This suggests that economic area 2b might produce very few dairy products in the future.

Other important trends in the animal agriculture of the area are shown in Table 3. The number of sheep and lambs sold decreased 28.0 percent during the decade. Egg production decreased 35 percent and chicken production, three percent. Broiler production increased almost 33 percent while turkey production remained practically unchanged.

TABLE 3--SALES OF ANIMAL PRODUCTS  
AND PERCENTAGE CHANGES 1954 TO 1959 IN  
STATE ECONOMIC AREA 2b

Livestock	Year		Percent Change
	1950	1959	
Cattle & Calves	213,553	298,129	+39.6
Hogs & Pigs	793,529	1,254,014	+58.0
Milk Cows (Numbers)	89,208	44,254	-49.6
Sheep & Lambs	196,451	141,413	-28.0
Turkeys Raised	141,486	142,490	+00.7
Broilers	511,299	678,600	+32.7
Chickens	1,477,741	1,433,811	-3.0
Eggs (Dozen)	15,104,297	9,834,065	-34.9

## Number Cash Grain Farms Increasing

Significant changes in types and numbers of farms occurred in the area during the decade of the 1950's. The decline in number of commercial farms in the area from 27,732 in 1950 to 21,701 in 1959 was mentioned earlier. This compared with a state decline from 215,157 to 161,117 for a percentage drop of 25.1 (Table 4).

A trend of major importance in economic area 2b was the increase in farms classified as cash grain farms. (A farm is classified in a particular type when more than 50 percent of its gross receipts fall in a particular category.) Farms classified as *cash grain* increased from 2,921

in 1950 to 4,481 in 1959 in the area. This was a 53 percent increase during the decade. The state increase was from 13,100 to 19,397 or 48 percent (Table 4).

Other major farm types decreased during the decade of the 1950's (Table 4). The decline in numbers of poultry farms was the greatest both in the state and in the area. The number of poultry, dairy, and livestock farms declined 82, 61 and 32 percent, respectively, during the 1950's in the area (Table 4). General and miscellaneous farms declined by 62 and 2 percent during the decade.

TABLE 4--TYPES OF FARMS AND PERCENTAGE CHANGES 1950-1959 IN  
STATE ECONOMIC AREA 2b AND STATE OF MISSOURI

Types of Farms	Number of Farms				Percentage Change from 1950-1959	
	State		Economic Area 2b		State	Economic Area 2b
	1950	1959	1950	1959		
Cash Grain	13,100	19,397	2,921	4,481	+48	+53
Poultry	6,832	2,179	781	140	-68	-82
Dairy	29,750	16,524	1,385	544	-44	-61
Livestock (Other than Poultry)	78,223	52,688	12,907	8,798	-33	-32
General	21,058	7,727	3,011	1,131	-63	-62
Miscellaneous	66,194	62,602	6,738	6,607	-5	-2
Total	215,157	161,117	27,743	21,701	-25.1	-21.8

## Number of Large Farms Increasing

The United States Census of Agriculture divides farms into two major categories, *Commercial* farms and *other* farms. All farms with gross sales more than \$2,500 are classed as commercial farms. Farms with gross sales of \$50 to \$2,499 were classified as commercial under the following conditions: (1) if the operator was under 65 years of age and did not work off the farm 100 days or more a year; (2) if the income received by the operator and members of his family from non-farm sources was less than the value of all farm products sold.

To relate the changes in farm size and numbers to the various economic classes through time the investigators defined the economic classes of farms as follows:

### GROSS SALES

Class I . . . over \$10,000      Class III . . . 2,500-4,999  
Class II . . . 5,000-9,999      Class IV . . . under 2,500

Table 5 shows the changes in numbers of farms in the various economic classes in economic area 2b from 1950 through 1959. The top economic class of farms, with gross sales of more than \$10,000, increased from 1,812 to 4,860 for a percentage increase of 168 percent. During the same time interval the bottom class of farms decreased from 9,320 to 1,222 for a percentage decline of 86.9 percent. Over-all, these data suggest that farms in the area will either increase in size to produce large sales volumes (more than \$10,000) or cease to stay in business as commercial farms.

TABLE 5--NUMBER OF COMMERCIAL FARMS BY ECONOMIC CLASS IN STATE ECONOMIC AREA 2b  
1950-1959

Class	Gross Sales	1950	1954	1959	Numerical Change 1950-1959	Percentage Change 1950-1959
I	over 10,000	1812	2836	4860	+3048	+168.2
II	5,000-9,999	4214	4754	4617	+403	+9.6
III	2,500-4,999	5831	5049	4501	-1330	-22.8
IV	under 2,500	9320	6748	1222	-8098	-86.9
	Total	21,177	19,387	15,200	-5977	-28.2

# Percentage of Income From Hogs and Beeves Increases

Tables 6 and 7 show (1) sources of agricultural revenue and (2) percentage of total agricultural revenue for the state and economic area 2b, 1954 through 1959. Total dollar sales of agricultural products increased approximately 38 percent in both the state and economic area 2b from 1950 to 1959.

Several important trends were indicated in both the state and economic area 2b. The percentage of revenue generated by sale of crops was fairly constant at approximately 35 percent in the state and in economic area 2b (Figs. 3 and 4). However, sales revenues generated by

livestock, other than poultry and dairy, increased in both the state and region during the study period.

As noted previously, the number of cash grain farms increased relatively more rapidly in both the state and region than the number of livestock farms, but the relative increase in sales revenue for livestock farms was slightly higher than that for cash grain farms. This suggests that the size of livestock farms has been increasing more rapidly than that of cash grain farms.

Poultry products accounted for 7 percent of the state farm revenue in 1954, but declined to slightly over 5 per-

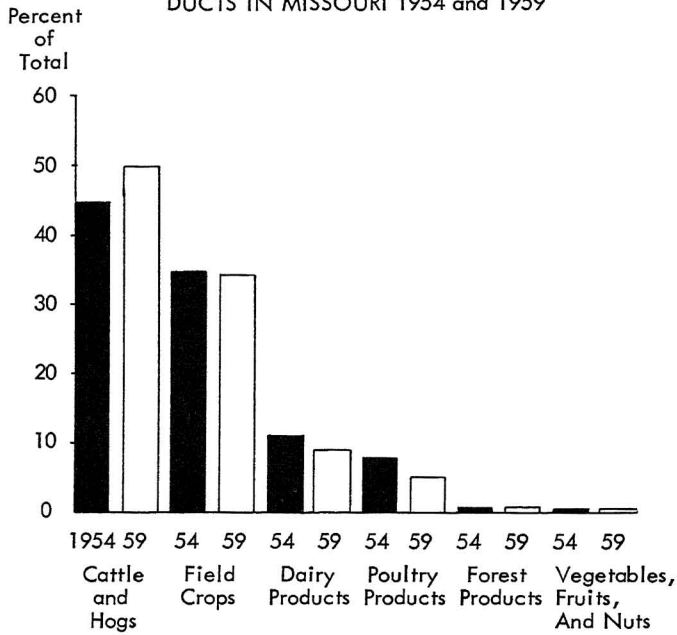
TABLE 6--SALES OF VARIOUS FARM PRODUCTS IN MISSOURI AND  
PERCENTAGE CHANGES 1954-1959

Product	1954 Total Sales (Millions)	1959 Total Sales (Millions)	Percentage Change 1954-1959
Field Crops	257.6	343.1	+31.5
Vegetables			
Fruits & Nuts	5.1	7.3	+43.1
Forest Products	8.7	12.6	+44.8
Total All Crops	271.4	363.0	+33.8
Cattle & Hogs	326.8	502.4	+53.7
Dairy Products	84.2	93.3	+10.8
Poultry Products	51.2	52.8	+ 3.1
Total All Animal Products	462.2	648.5	+40.3
Total All Sales	733.6	1,011.5	+38.0

TABLE 7--SALES OF VARIOUS FARM PRODUCTS IN STATE ECONOMIC AREA 2b  
AND PERCENTAGE CHANGES 1954-1959

Product	1954 Total Sales (Millions)	1959 Total Sales (Millions)	Percentage Change 1954-1959
Field Crops	38.0	52.8	+38.9
Vegetables			
Fruits & Nuts	.4	.5	+25.0
Forest Products	1.0	1.8	+80.0
Total All Crops	39.4	55.1	+39.8
Cattle & Hogs	62.8	92.0	+46.5
Dairy Products	5.6	5.4	- 3.7
Poultry Products	5.1	4.0	-21.6
Total All Animal Products	73.5	101.4	+38.0
Total All Sales	112.9	156.5	+38.6

Fig. 3 PERCENTAGE OF TOTAL SALES BY PRODUCTS IN MISSOURI 1954 and 1959

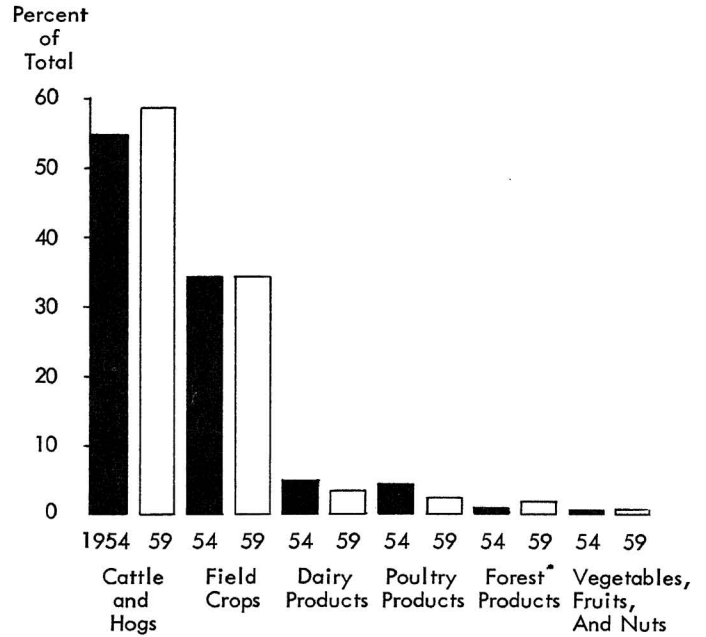


COMMODITIES SOLD IN MISSOURI 1954 and 1959

cent in 1959 (Fig. 3). Sales of dairy products declined from 11 to 9 percent of the total during the period of study.

The decline in importance of poultry and dairy enterprises as sources of income also appeared in economic area 2b. Sales of poultry products accounted for 4.5 percent of farm income in 1954 but had declined to only 2.5

Fig. 4 PERCENTAGE OF TOTAL SALES BY PRODUCTS IN AREA 2b 1954 AND 1959



percent in 1959 (Fig. 4). Similarly, dairy income declined from 5.0 percent to slightly over 3 percent.

Economic area 2b accounted for approximately 15 percent of the state's total sales of crops during the study period. Livestock production was slightly more important in the area than in the state, accounting for almost 20 percent of the state's total livestock sales.

## Trend to More Specialization

At the time of the 1959 Census the economic classification farms by gross sales were:

Class of Farm	Value of Farm Products Sold
I.....	over \$40,000
II.....	20,000 to 39,999
III.....	10,000 to 19,999
IV.....	5,000 to 9,999
V.....	2,500 to 4,999
VI.....	50 to 2,499

Data were available from the 1959 Census for the state to determine the percentages of the total revenue

received by the various economic classes and the portions within each class coming from various types of products. An analysis was made of these data to determine the degree of specialization by types of products in the various economic classes.

Results of the analysis of livestock and cash grain farms appear in Figs. 5 and 6. The percentage of total sales accounted for by livestock on farms classified as livestock farms ranged from 89.4 for class I to approximately 80 for the other classes of economic farms (Fig. 5). Crops accounted for more than three-fourths of total sales on all economic classes of farms classified as cash grain



Fig. 5 DISTRIBUTION OF SALES BETWEEN ANIMALS AND CROPS IN MISSOURI BY ECONOMIC CLASS ON LIVE-STOCK FARMS 1959.

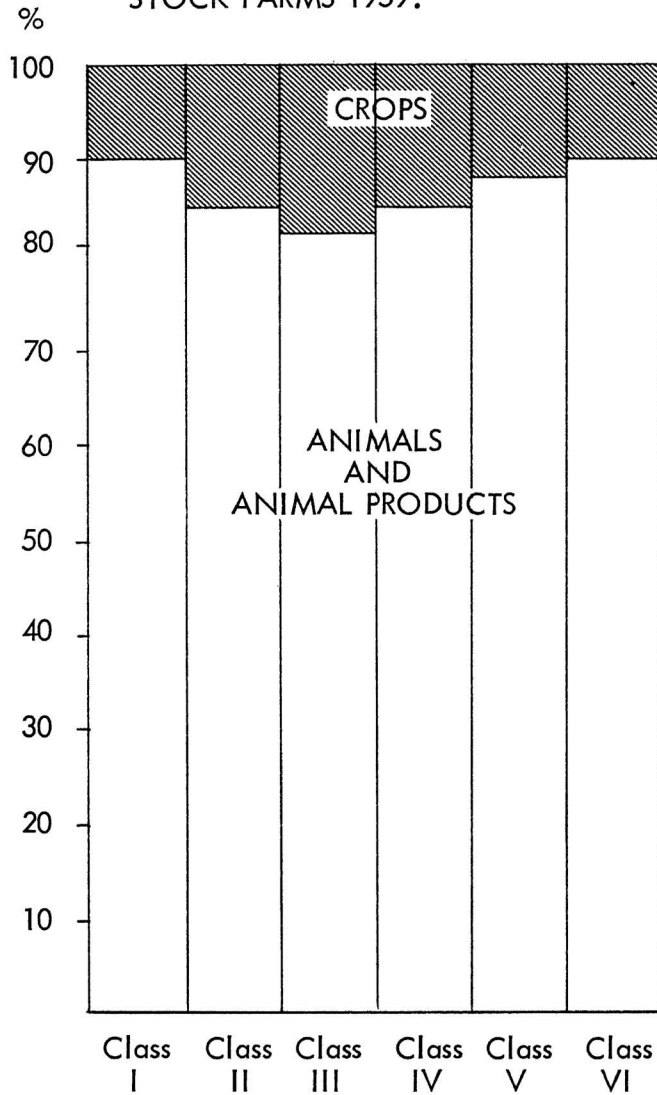
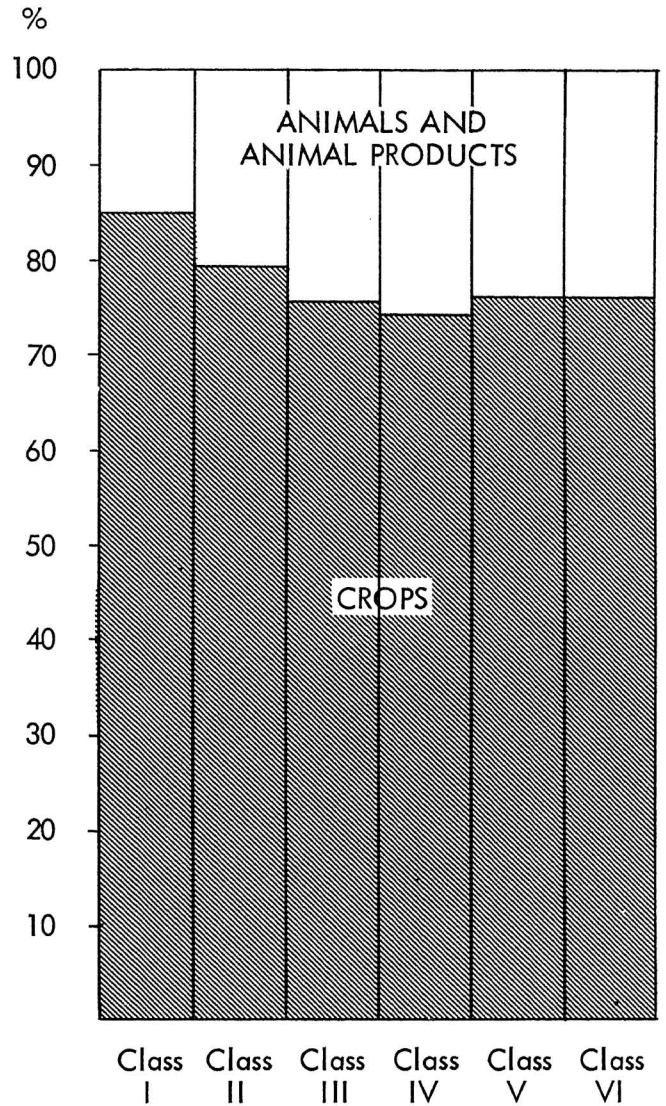


Fig. 6 DISTRIBUTION OF SALES BETWEEN ANIMALS AND CROPS IN MISSOURI BY ECONOMIC CLASS ON CASH GRAIN FARMS.



farms (Fig. 6). These figures support the conclusion that farms in Missouri were moving to specialized producing units with large scale operations.

The top three economic classes of livestock farms with sales over \$10,000 accounted for more than 60 percent of the state's sales of livestock products sold by commercial farms in 1959. Yet, only 24 percent of the livestock farms in the state were included in the top three economic classes.

For cash grain farms the top three economic classes accounted for 64 percent of the total sales for these types

of farms. Approximately 32 percent of the cash grain farms were included in the top three economic classes in 1959.

Other types of farms in the state show the same trends as cash grain and livestock farms. Data were not available to make a separate analysis of economic area 2b with respect to degree of specialization and concentration of sales in the top three economic classes. However, other data concerning changes in farm size and sales of commodities in economic area 2b suggest even greater specialization and concentration of sales in large farms than in the state as a whole.

# Big Potential For Cattle Feeding

An analysis was made to determine the potential for adjustment in the farm economy of the area relative to the land capability classifications.

Seven land capability classes were defined for the area based on potential yield adaptability to different crops grown in the area. The classifications were those determined by the Soil Conservation Service in co-operation with agronomists and other University specialists. The available land in each use class was compared with land used for various purposes as reported by the 1959 Census of agriculture. The classes defined were as follows:

Class I and II—High yield potential for corn and row crops or small grain.

Class IIIa—High and medium yields of corn and small grains.

Class IIIb—Medium yield ratings for small grain and hay.

Class IIIc—Low yields for hay and pasture.

Class IV—Moderately adaptable for hay and pasture.

Class V, VI, and VII—Generally unadaptable to cropping.

The uses of the various land classes by capability classification are shown in Table 8. From the total land area used for farming, 5.6 million acres, 3.6 million acres were classified IIIa. This includes approximately 65 percent of the land area in farms in a classification moderately to highly adapted to row cropping or small grain production (Table 8). Seventy-seven percent of the land area (4.3 million acres) is included in classifications highly or moderately adaptable to row crop and small grain culture. These facts alone suggest high potential for the area in feed grain and livestock producing enterprises.

The major uses of cropland in economic area 2b in 1959 are shown in Table 9. Approximately 1.4 million acres of land was used for row crops (corn, soybeans, and

sorghums) in 1959. About 1 million acres of land was used for hay and pasture in 1959 that was suitable for row crop production (Tables 8 and 9). This suggests that continuation of economic conditions similar to those prevailing in the decade of the 1950's will produce a continuing shift from pasture and hay to cash grain farming in the area.

An analysis of the feed grain production in 1959 indicated that the area produced an exportable grain surplus of approximately 16 million bushels of corn equivalents based on livestock operations. The large unused potential of the area for feed grain production, coupled with its large exportable grain surplus suggests a much larger potential for livestock feeding in the area.

Many difficult-to-quantify variables will ultimately determine the extent of the development of the potential grain producing and livestock feeding in area 2b. The area is well situated from the standpoint of markets, both in St. Louis and Chicago. Large stretches of relatively flat land formerly used for hay and pasture production may be shifted to grain production.

Development of the potential of the area for livestock feeding involves a more difficult problem of analysis. Large supplies of feed relative to demand should offer an advantage to the skillful manager. However, management skills are more demanding in livestock operations than in grain production. A shortage of adequate managerial talent may be the ultimate deterrent to the development of the area to its full potential as a livestock feeding region. Ultimately, this objective will need to be stimulated by extension personnel, private businessmen, and other leaders interested in development of the full agricultural production potential of the area.

TABLE 8--LAND USE BY LAND CAPABILITY CLASSES IN STATE ECONOMIC AREA 2b, 1959

Land Use	Land Capability Class							Total
	I	II	IIIa	IIIb	IIIc	IV	V-VII	
Cropland	150,730	324,595	2,215,843	42,497	65,768	--	201,217	3,000,650
Pasture	33,923	102,678	845,682	18,657	4,453	--	363,186	1,368,579
Woodland & Other Uses	35,978	86,130	526,468	5,436	21,645	--	555,283	1,230,940
Total	220,631	513,403	3,587,993	66,590	91,866	--	1,119,686	5,600,169
Percent of Total in Various Classes	3.9	9.1	64.3	1.2	1.6	0	19.6	

TABLE 9--MAJOR USES OF CROPLAND IN STATE ECONOMIC AREA 2b, 1959

<u>Land Use:</u>			
Corn for grain	786,470		
Corn for other purposes	45,227		
Total Corn		831,697	
Soybeans		553,578	
Sorghum		40,697	
Wheat		249,726	
Other small grain		99,963	
Hay crop		330,909	
Field seed crops		<u>107,319</u>	2,213,889
Total cropland harvested			589,196
Cropland used only for pasture			
<u>Cropland Not Harvested,</u>			
<u>Not Pastured:</u>			
Soil improvement grasses		62,163	
Other cropland		<u>107,887</u>	
Sub Total			<u>170,050</u>
Total cropland in farms			<u><u>2,973,135</u></u>

# Summary and Conclusions

The economy of economic area 2b in Northeast Missouri is being greatly affected by changes in the basic farm employment. This area is similar to many other areas in rural America that have experienced slow growth as the result of changing farm technology with ensuing loss of employment in farming. In some areas this has resulted in slowing the growth of sales by businesses dependent on population of the area. The purpose of the report was to project changes in the area which should be of interest to businessmen, politicians, and other public and private decision makers.

Important findings and conclusions of the study were:

1. Number of commercial farms declined from slightly over 21,000 in 1950 to just over 15,000 in 1959. An adjustment to 10,000 commercial farms in the area by 1975 is possible. A decline in farm employment of 25 to 50 percent during the next decade is possible.

2. Although total farm numbers are declining, the number of large commercial specialized farms is increasing rapidly in the area. Numbers of farms selling more than \$10,000 worth of products increased from 1,812 in 1950 to 4,860 in 1959—a percentage increase of 168.

3. Land utilization in the area is shifting to row crop production, particularly corn and soybeans. Corn acreage increased from 660 thousand in 1950 to 865 thousand in 1959. Soybean acreage increased from 267 thousand in 1950 to 576 thousand in 1959. These changes indicate a shift of land from hay and pasture use to corn and soybeans.

4. Cattle and hog production increased between 40 and 50 percent during the decade of the 1950's.

5. Dairy cattle farms declined by approximately 50 percent during the period.

6. Poultry and egg production declined during the 1950's but broiler production increased slightly over 30 percent.

7. Number of cash grain farms increased from 2,721 in 1950 to 4,481 in 1959. All other types of farms, including livestock farms, declined in numbers. This suggests a substantial shift in emphasis to cash grain farming in the area.

8. Analysis of revenue source by type and class of farm for the entire state suggests a rapid shift of farm production into large specialized operations. Data were not available to make this analysis for economic area 2b. Class I, II, and III livestock farms (those with sales of over 10,000) accounted for almost 65 percent of the livestock sales in the state. These farms derived an average of over 85 percent of their revenue from the sale of livestock.

9. Land utilization in 1959 compared with land available and capable of producing row crops indicated that approximately 1 million acres of land could be shifted from hay, pasture, and other uses to row crop production. This suggests that the shifts to row crop production occurring in the 1950's has not reached its potential, assuming economic conditions similar to the decade of the 1950's continue to prevail. Apparently, land utilization adjustments in response to changes in technology and economic conditions have occurred in this area on an extended time lag basis.

10. The area was producing a substantial grain surplus in the 1950's. This, coupled with the considerable potential for grain production expansion, suggests an undeveloped potential of the area as a livestock feeding area.

In summary, the agriculture of the area has undergone significant changes in land utilization and numbers, types, and sizes of farms. The continued decline in farm employment may result in reduced sales by retailers dependent on the level of employment in the area. The problem of further quantifying the impact of change in farm employment upon small town economies is the subject of continuing research.

Many small towns in economic area 2b could have increasing difficulty in maintaining satisfactory rates of growth in volume of business. The declining trade resulting from reduced employment in farming and other basic sectors of the local economy may produce serious adjustment problems. Public and private decision makers must attempt to take these changes into account when planning development and capital expenditures.