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CHANGING GEOGRAPHIC LOCATION OF AGRICULTURAL PRODUCTION

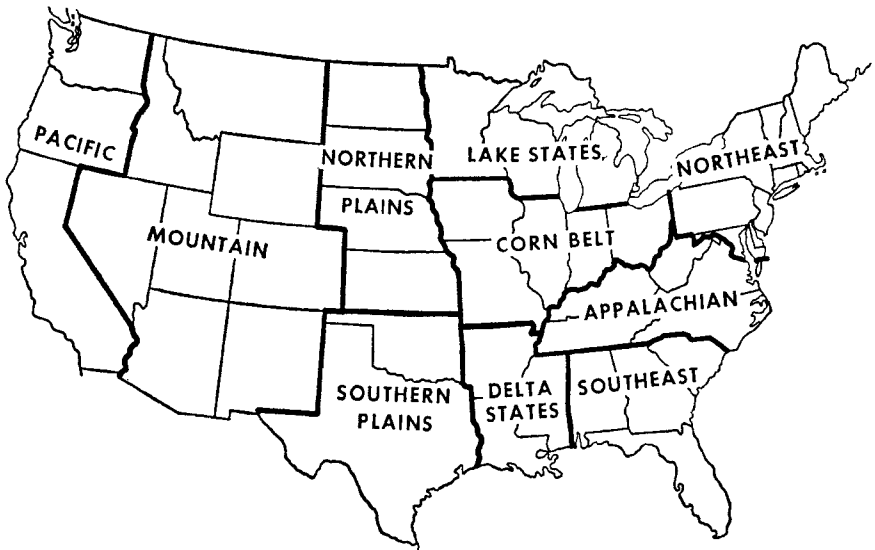
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My assignment is to examine one broad aspect of agricultural change in recent years—the changing geographic location of production, and its role in the economic growth of agriculture in the different farming regions of the United States. Put more simply, the broad question I am to answer is: What is the impact of the changing location of farm production on the ability of agriculture to provide employment opportunities in the various areas of our country?

Available data permit an examination of changes since World War II among ten broad farm production regions (see map). Within this framework of geographic detail and time period, I will address myself to the following specific questions, in the order in which they are listed.

1. What shifts have occurred in the geographic location of production, in terms of crop and livestock enterprises, and total farm output?

FARM PRODUCTION REGIONS



2. To what extent has use of production resources shifted in agriculture?

3. Have regions varied markedly in growth in resource productivity and in changes in structure of agriculture?

4. What can we conclude from the answers to the preceding questions regarding the relative ability of agriculture in the various regions to provide employment opportunities for farm people?

REGIONAL SHIFTS IN FARM PRODUCTION

As a basis for measuring the extent to which production has shifted geographically since World War II, production aggregates in each of ten farm production regions were averaged for the five-year periods, 1946-50 and 1956-60. From these data, two simple measures were calculated: (1) Production in each region in 1956-60 was expressed as an index with production in 1946-50 equal to 100 and (2) a measure of change in regional share of U. S. production was derived by subtracting the percentage share of a given region in U. S. production in 1946-50 from its percentage share in 1956-60.

The two measures are obviously interrelated—a region with an index of production larger than that for the United States as a whole shows a gain in relative share of production, and vice versa. Also, the size of the measure of change in regional share of production depends partly upon the relative importance of any given region in U. S. production in 1946-50.

Kinds of Livestock Production

Except for poultry products, regional distribution of livestock production changed little in the last decade. The change in regional share of production from 1946-50 to 1956-60 ranges only from —0.6 to 0.5 percent (Table 1). Production of meat animals continued to be concentrated in the Corn Belt and the Northern Plains, which together accounted for about half of the U. S. total throughout the period.

The picture is much the same for dairy products. The measure of change in regional share of output of dairy products ranges between —1.6 percent in the Corn Belt and 1.6 percent in the Lake States, somewhat greater than for meat animals. The Northeast, Lake States, and Corn Belt regions provided slightly more than 60 percent of our national production of dairy products in both 1946-50 and 1956-60.

Significant changes occurred in the regional location of poultry production. Because of the rapid expansion of its broiler industry, the Southeast accounted for 13.5 percent of the U. S. output of poultry products in 1956-60, compared with about 5 percent in

TABLE 1. GEOGRAPHIC SHIFTS IN KINDS OF LIVESTOCK PRODUCTION, 1946-50 TO 1956-60

Region	Production Index ¹			Change in Regional Share ²		
	Meat Animals	Dairy Products	Poultry Products	Meat Animals	Dairy Products	Poultry Products
	<i>Percent</i>					
Northeast	103	116	128	-0.6	1.3	-2.1
Lake States	117	118	116	-.4	1.6	-2.0
Corn Belt	121	100	105	-.2	-1.6	-5.7
Northern Plains	123	93	91	.2	-.8	-2.5
Appalachian	120	108	157	-.1	-.1	1.1
Southeast	143	114	367	.5	.2	8.2
Delta States	130	98	259	.2	-.4	3.1
Southern Plains	115	85	126	-.4	-1.2	-.6
Mountain	127	109	99	.3	0	-.9
Pacific	137	122	163	.5	1.0	1.4
United States	122	109	141	0	0	0

¹ 1956-60, with 1946-50 = 100.

² Percentage of U. S. total in 1956-60 minus percentage of U. S. total in 1946-50.

1946-50. The Southeast gained largely at the expense of the Corn Belt, whose regional share dropped by nearly 6 percent.

Kinds of Crop Production

Data for the five major groups of crops shown in Table 2 suggest that, in general, from 1946-50 to 1956-60, the geographic location of production of crops changed more than that of livestock. None of the crop groups shows as much stability in regional shares of production as do meat animals.

Shifts in production of feed grains were small, ranging from a decrease of 1.6 percent in the share of the Appalachian region to a gain of 1.4 percent in the Southern Plains.

The degree of shift in location of production of cotton and oil crops approaches the relatively large change in regional shares of poultry production. The regional share of cotton production dropped by more than 5 percent in both the Southeast and the Delta States. Cotton production shifted markedly from eastern to western regions during the period, with the Pacific region gaining the most—6 percent.

The bulk of the regional shifts in oil crops during the period were occasioned by major changes in production of soybeans. The Southeast had a loss in regional share of 6 percent—owing to a decrease in production of peanuts. Gains in regional shares of about the same magnitude (6 percent) were recorded in the Corn Belt and Delta States, where soybean production expanded rapidly. The Corn

TABLE 2. GEOGRAPHIC SHIFTS IN KINDS OF CROP PRODUCTION, 1946-50 TO 1956-60

Region	Production Index ¹					Change in Regional Share ²				
	Feed Grains	Food Grains	Fruits and Vegetables	Cotton	Oil Crops	Feed Grains	Food Grains	Fruits and Vegetables	Cotton	Oil Crops
Northeast	124	77	93	—	391	-0.1	-0.8	-1.9	—	0.8
Lake States	128	104	113	—	150	-.1	0	.6	—	-.8
Corn Belt	125	114	79	102	181	-1.2	1.4	-1.2	0	5.7
Northern Plains	132	95	79	—	152	.5	-2.6	-.5	—	-.6
Appalachian	100	96	80	81	151	-1.6	-.1	-1.3	-2.0	-.5
Southeast	133	163	121	71	89	.2	.2	1.9	-5.6	-6.1
Delta States	91	145	71	86	527	-.7	1.4	-1.0	-5.2	6.3
Southern Plains	167	98	82	115	71	1.4	-.5	-.9	3.0	-3.0
Mountain	156	108	111	195	33	.5	.7	.5	3.8	-.6
Pacific	203	105	116	190	44	1.1	.3	3.8	6.0	-1.2
United States	128	102	104	105	161	0	0	0	0	0

¹ 1956-60, with 1946-50 = 100.

² Percentage of U. S. total in 1956-60 minus percentage of U. S. total in 1946-50.

Belt enhanced its dominant position in production of oil crops with an increase in regional share from 46 to 52 percent. The Delta States increased their share of the U. S. output from less than 3 percent in 1946-50 to more than 9 percent in 1956-60.

Geographic shifts in food grains and fruits and vegetables were only moderate.

Shifts in Total Production

Shifts in regional location of aggregate production of livestock and crops, and of total farm output have been more moderate than the shifts in production of individual groups of enterprises since World War II (Table 3).

TABLE 3. GEOGRAPHIC SHIFTS IN TOTAL FARM PRODUCTION, 1946-50 to 1956-60

Region	Production Index ¹			Change in Regional Share ²		
	Livestock	Crops	Farm Output	Livestock	Crops	Farm Output
					<i>Percent</i>	
Northeast	119	99	112	-0.4	-1.0	-0.7
Lake States	117	125	125	-.5	.9	.3
Corn Belt	115	126	125	-1.8	2.1	.7
Northern Plains	114	116	118	-.6	.1	-.3
Appalachian	126	95	109	.2	-1.7	-.9
Southeast	194	101	128	2.3	-.9	.4
Delta States	151	101	121	.8	-.8	0
Southern Plains	110	113	116	-.8	-.1	-.4
Mountain	120	124	126	-.1	.5	.2
Pacific	139	126	130	.9	.9	.7
United States	122	115	121	0	0	0

¹ 1956-60, with 1946-50 = 100.

² Percentage of U. S. total in 1956-60 minus percentage of U. S. total in 1946-50.

A few generalizations can be made from our data on regional shifts in location of production. First, the data show definite evidence of increasing specialization of production. Chief examples are the moderate increases in regional shares of dairy production in the Northeast and the Lakes States, and a more pronounced gain in relative production of oil crops in the Corn Belt and the Delta States. Economic, institutional, and technological forces also are giving a comparative advantage in cotton production to western regions relative to eastern regions. The same forces are behind the shift of poultry production to the Southeast and the Delta States.

In general, compensating shifts in production have taken place within regions. For example, changes in total livestock production

in the Southeast and the Corn Belt were partly offset by opposite changes in relative shares of total crop output.

Compensating shifts in production occurred to a greater extent in production of crops than of livestock. The Appalachian region recorded a loss in relative share of both total crop production and production of each of the five crop groups shown in Table 2. Each of the nine remaining regions had compensating shifts in crop production.

Shifts in total crop production and in total livestock production were offsetting in seven of the ten regions. The Pacific region gained in relative share of both crop and livestock production, while the Northeast and the Southern Plains lost on both scores.

Based on the foregoing appraisal of data for the ten farm production regions, I conclude that shifts in location of total agricultural production since World War II have been nominal. It follows also that the shifts in geographic location have had little impact on the relative ability of agricultural regions to provide farm employment opportunities for people during the period.

As is usually the case with broad generalizations, the probability of sharp departures from the general pattern must be recognized. Localized impacts of spreading urbanization and suburbanization, and of land reclamation and development projects are obvious sources of such departures.

In view of rapid changes in technology and accompanying gains in the productivity of resources used in agriculture, regional differentials in resource adjustments over the period under consideration might logically be expected.

REGIONAL SHIFTS IN RESOURCE USE

Regional shifts in resource use have been of about the same magnitude as changes in geographic location of production (Table 4). The substitution of nonfarm inputs for farm labor and farm land has been a general phenomenon in all of the ten farm production regions. Decreases from 1946-50 to 1956-60 in man-hours of farm labor used range from 25 percent in the Pacific region to 43 percent in the Delta States. Changes in regional shares of farm labor input have been moderate, however, varying from —1.4 percent to 1.1 percent. Labor inputs decreased somewhat more rapidly in the four southern regions than in the United States as a whole.

The pattern of regional shifts in cropland is similar to that for inputs of farm labor. Total acres of cropland used in the United States dropped by less than 5 percent from 1946-50 to 1956-60, but regions varied from a decline of 20 percent in the Southeast to an increase

TABLE 4. GEOGRAPHIC SHIFTS IN RESOURCE USE, 1946-50 TO 1956-60

Region	Index of Quantity ¹			Change in Regional Share ²		
	Man-hours of Farm Labor	Crop- land Used	Fertilizer Plant Nutrients ³	Man-hours of Farm Labor	Crop- land Used	Fertilizer Plant Nutrients ³
				<i>Percent</i>		
Northeast	69	83	125	0.2	-0.6	-4.3
Lake States	73	95	231	1.0	.1	2.1
Corn Belt	71	101	246	1.1	1.2	6.8
Northern Plains	70	99	553	.4	.7	2.7
Appalachian	62	82	130	-1.1	-.8	-5.4
Southeast	59	80	140	-1.3	-.9	-4.6
Delta States	57	88	155	-1.4	-.3	-1.0
Southern Plains	64	88	231	-.3	-.9	.9
Mountain	74	109	329	.5	1.2	1.3
Pacific	75	105	225	.9	.5	1.5
United States	67	96	179	0	0	0

¹ 1956-60, with 1946-50 = 100.

² Percentage of U. S. total in 1956-60 minus percentage of U. S. total in 1946-50.

³ Based on 1956-59 average.

of 9 percent in the Mountain States. The four southern regions, as well as the Northeast and Lake States, lost in regional shares. Changes in regional shares were moderate, ranging from -0.9 percent to 1.2 percent.

Increases in fertilizer use over the period under consideration varied widely, ranging from a rise of only 25 percent in the Northeast to an increase of about 450 percent in the Northern Plains (Table 4). Chief changes were an increase in the relative share of the Corn Belt and losses of about 5 percent in the shares of the Appalachian, Southeast, and Northeast regions.

Regional changes in crop production per acre and in farm output per man-hour reflect in part the influence of increasing use in agriculture of nonfarm inputs, such as machinery and fertilizer (Table 5). Farm output per man-hour rose substantially in all regions from 1946-50 to 1956-60. Labor productivity more than doubled in the Southeast and Delta States—the two regions that also showed the greatest decline in man-hour inputs. The smallest gain—about 60 percent—was recorded in the Northeast.

Increases in crop production per acre ranged from 14 percent in the Mountain region to 32 percent in the Lake States. The generally marked increases in output per man-hour and in crop production per acre indicate that substitution of nonfarm inputs for farm labor and farmland, as well as technological advance, have characterized agricultural changes in all regions.

TABLE 5. TRENDS IN RESOURCE PRODUCTIVITY, BY FARM PRODUCTION REGIONS, 1946-50 TO 1956-60¹

Region	Farm Output per Man-hour	Crop Production per Acre
Northeast	162	119
Lake States	171	132
Corn Belt	176	125
Northern Plains	169	117
Appalachian	176	116
Southeast	217	126
Delta States	212	115
Southern Plains	181	128
Mountain	170	114
Pacific	173	120
United States	181	120

¹ Index of 1956-60, with 1946-50 = 100.

CHANGES IN NUMBER OF FARMS AND FARM WORKERS

As might be expected from our appraisal thus far, changes in regional distribution of farms and farm workers have been moderate. Farm employment in the United States dropped by nearly a fourth from 1950-51 to 1956-60 (Table 6). Regional changes during this period ranged from a drop of 12 percent in the Pacific region to a decrease of 33 percent in the Delta States. Changes in the regional

TABLE 6. GEOGRAPHIC SHIFTS IN FARM EMPLOYMENT AND NUMBER OF FARMS DURING SPECIFIED PERIODS, 1946-50 TO 1956-60

Region	Index of Number		Change in Regional Share	
	Farm Workers ¹	Farms ²	Farm Workers ³	Farms ⁴
<i>Percent</i>				
Northeast	73	72	-0.5	-1.2
Lake States	84	86	.9	.2
Corn Belt	80	87	.8	1.0
Northern Plains	79	89	.1	.5
Appalachian	74	85	-.5	.3
Southeast	70	79	-.9	-.5
Delta States	67	78	-1.2	-.6
Southern Plains	76	79	-.2	-.4
Mountain	86	88	.5	.3
Pacific	88	89	1.0	.4
United States	77	83	0	0

¹ 1956-60, with 1950-51 = 100.

² 1956-59, with 1946-50 = 100. Data relate to all farms as estimated by the Statistical Reporting Service.

³ Percentage of U. S. total in 1956-60 minus percentage of U. S. total in 1950-51.

⁴ Percentage of U. S. total in 1956-59 minus percentage of U. S. total in 1946-50.

share of farm employment varied from —1.2 to 1.0 percent. The four southern regions and the Northeast recorded losses in regional shares, and all other regions had moderate gains.

The regional pattern of change in total number of farms is similar to that for farm workers, although farm numbers did not decrease as rapidly as farm employment. The Northeast and three of the four southern regions showed declines in regional shares of farm numbers from 1946-50 to 1956-59. Changes in regional shares were moderate, ranging from —1.2 to 1.0 percent.

SUMMARY APPRAISAL OF JOB OPPORTUNITIES IN AGRICULTURE

I conclude that shifts in location of production among farm production regions from 1946-50 to 1956-60 affected very little the relative ability of the various regions to provide employment opportunities for farm people. Although significant shifts in location of production of individual farm enterprises occurred, they were largely offset by opposite shifts in production of other enterprises.

The economic, institutional, and technological forces behind the shifts in production since World War II are expected to continue in the future. Although variations from the general pattern may occur in smaller geographic areas, similarity of change among the ten broad farming regions likely will be the pattern over the next decade as it has been since World War II.

We must look to factors other than shifts in location of production if we are to appraise adequately job prospects in agriculture. Recent work by R. Nikolitch of the Farm Economics Division, Economic Research Service, shows that an analysis of the changing size structure of U. S. farms is a fruitful route. Nikolitch classified commercial farms into family size and larger-than-family size. Family-size farms are those on which the operator and unpaid family members provide most of the labor and management. As a farm family can be expected to provide no more than 1.5 man-years of labor, a farm was classed as family size if less than 1.5 man-years of hired labor was used.

Family-size farms were further classified as “adequate” and “inadequate” units. For purposes of analysis, \$10,000 or more of gross sales was used as an indicator of adequate family-size farms. As the number of family farms with sales of this volume is rapidly increasing, it is assumed that they have enough resources and productivity to yield the income needed for expenses of family living, farm operating expenses including depreciation and interest on borrowed capital, and savings sufficient for further capital investments and rising levels of living.

The data in Table 7 support several important conclusions. Although the number of commercial farms has decreased rapidly, family farms have been "holding their own" proportionately. The number of adequate family farms doubled between 1949 and 1959, while the number of inadequate family farms decreased by half.

TABLE 7. ESTIMATES OF COMMERCIAL FARMS GROUPED BY FAMILY AND LARGER-THAN-FAMILY FARMS, UNITED STATES, SPECIFIED YEARS¹

Type of Commercial Farm	Number of Farms			Percentage Change 1949 to 1959
	1949	1954	1959 ⁷	
	<i>Thousands</i>			
Family size ²				
Adequate ³	334	440	680	+104
Inadequate ⁴	3,138	2,698	1,582	- 50
Total	3,472	3,138	2,262	- 35
	<i>Percent</i>			
Proportion of adequate	10	14	30	
	<i>Thousands</i>			
Larger than family ⁵				
\$10,000 or more marketing ⁶	150	142	114	- 24
Less than \$10,000 worth of marketing	84	47	36	- 57
Total	234	189	150	- 36
All farms	3,706	3,327	2,412	- 35

¹ Estimates developed by R. Nikolitch, Farm Economics Division, ERS, USDA. Adjusted to 1959 farm definition.

² Using less than 1.5 man-years of hired labor.

³ Producing \$10,000 or more of marketings. Since the number of these farms is increasing rapidly, it is assumed that they are characterized by the resources and productivity required to yield sufficient income for: (a) family living expenses; (b) farm expenses including depreciation, maintenance of the livestock herd, equipment, land, buildings, interest on borrowed capital; and (c) enough capital growth for new farm investments required to keep in step with technological advance and rising levels of living.

⁴ Producing less than \$10,000 worth of marketings. Since the number of these farms is decreasing rapidly, it is assumed that on the average they do not have the characteristics of adequacy specified in the preceding footnote.

⁵ Using 1.5 man-years or more of hired labor.

⁶ The marked decline in the number of these farms is assumed to be due to the fact that the substitution of labor-saving machinery is shifting many hitherto larger-than-family farms into the category of business in which the family is able to do most of the work.

⁷ Preliminary estimates.

The economic, institutional, and technological forces behind these trends in numbers of family farms will continue to operate in the future and hence will have a major effect on the ability of agriculture to provide economic opportunities for people. With relatively stable growth in population on farms, about 250,000 male farm youth will

be looking for job opportunities each year during the next decade.¹ How many of this 250,000 youth are likely to find opportunities as operators of farms with \$5,000 or more of gross sales? For many types of farms this would provide a modest net income. Considering the net effects of deaths, retirements, probable movement of farm operators from smaller to larger farms, and movement of persons from nonfarm occupations to farming, employment opportunities as farm operators may average less than 25,000 annually during the 1960's. This means that only one in ten male farm youths can look forward to becoming operators of farms with sales of \$5,000 or more. Obviously, the proportion who might find opportunities as farm operators would be much smaller if "employment opportunity" were defined as farms with sales of \$10,000 or more.

Analysis of the prospective supply of, and demand for, job opportunities in agriculture along the preceding lines points up the problems ahead in assisting farm people to adjust to their best alternative economic opportunities.

¹ The estimates of employment opportunities that follow are based on analysis in a seminar paper, "Opportunities and Limitations for Employment of Farm People Within and Outside of Farming" by Karl Shoemaker, Federal Extension Service, U. S. Department of Agriculture, Washington, D. C.