Agricultural Economics
Series 13

August 1967

AGRICULTURE AND INDUSTRIAL DEVELOPMENT

in a Six-County Area of Alabama

AGRICULTURAL EXPERIMENT STATION
OF AUBURN UNIVERSITY

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Contents

Preface

Many individuals and organizations are becoming interested in planning for economic development. The first step in such an undertaking is a review of the present problems and opportunities. Fortunately, there is a wealth of statistical information available for such a study.

The purpose of this report is to emphasize a framework of analysis that can be applied to the available information. Sources of information that are likely to prove useful are: publications of the Bureau of Business Research, University of Alabama, the Alabama Agricultural Extension Service, Auburn University; the Census of Manufacturing for Alabama, the Census of Business for Alabama, the Census of Agriculture for Alabama; the Census of Population; the Statistical abstract of the United States; and the Alabama Department of Industrial Relations. The State Planning and Industrial Development Board, the Alabama Power Co., the Alabama State Chamber of Commerce and local chambers of Commerce also have material on file that can be of interest and use to local planners.

Data from several of the sources listed were compiled for this report by John Elliot, Jr., as part of the requirement for the Master of Agriculture degree (1). Additional data and framework applicable for resource inventory may be found in the Inventory of Human and Physical Resources Cherokee, Dekalb, Jackson, and Marshall Counties, Alabama, Agricultural Economics Series 10, Agricultural Experiment Station, Auburn University.

Agriculture and Industrial Development in a Six-County Area of Alabama.

John R. Elliot and Bill R. Miller*

Community leaders in many counties of Alabama are actively engaged in promoting employment opportunities and attempting to make more adequate use of resources leading to improved standards of living.

People in counties that have predominately rural and agriculturally based economies face problems of development that are unique from those of an urban-industrial economy. Rural areas that face problems of growth must also face the problem of declining job opportunities in their major industry, agriculture. But paradoxically, this problem is a measure of the success of agriculture. As concluded in a recent report, "the hallmark of modern economic development is the capacity of a nation to meet its food and fiber needs, while at the same time releasing its human and physical resources for the production of other goods and services. The more rapidly agriculture declines in relative importance within an expanding economy the greater is its contribution to the growth process."(2)

This report describes how some of the key economic variables (employment, population, investment, and income) have been involved in growth and contrasts growth in an urban county with that in nearby rural areas. Six Alabama counties, Fayette, Lamar, Marion, Winston, Pickens (all rural), and Tuscaloosa (urban) were studied.

The approach was essentially that of studying the economic base of an area and its relation to economic growth. Briefly, products of the economic

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base were defined as: (1) products produced at the primary level and exported, such as lumber, paper, and clays; and (2) finished products for export produced at a secondary level using raw materials of the area plus larger amounts of imports. This important secondary group of basic industries includes textile, apparel, furniture, rubber, chemical, steel and electrical goods. An additional group of industries were either service or market oriented and their presence was partly dependent on the presence of the growth generating basic industries. Examples of these are wholesalers, retailers, doctors, lawyers, teachers, and other service groups. A more complete discussion of the concept, economic base, is given by Andrews (3). Extensive use of the concept of basic and service industry is used in the following sections. Agriculture is a basic industry treated separately in the report to emphasize its role in the development process.

Employment and Population Changes during 1950-1959

Significant economic changes have occurred in rural and urban counties of the six-county area. Industrial growth has taken place, farms have declined in number, and the traditional agricultural economy has been supplemented by many types of nonagricultural activities. Employment and population data in Table 1 indicate the interaction of agricultural and other basic industrial activities during a period of rapid change. During the 10-year period 1950-59, agricultural employment declined by 70 per cent in the rural counties and 64 per cent in Tuscaloosa County. Nonagricultural employment increased by 44 per cent in the rural counties and 32 per cent in Tuscaloosa County. The rural counties had a population decline of 16,696 people during the decade. Tuscaloosa, the urban county, gained 14,955 in population.

TABLE 1. Employment and Population Changes in Tuscaloosa County and the Surrounding Five-County Rural Area, 1950-1959

Item	Tuscaloosa County	Five-County Rural Area
Total agricultural employment, 1950	4,320	16,280
Total agricultural employment, 1959	1,567	4,848
Per cent change from 1950	-64	-70
Change in total agricultural employment, 1950-1959	-2,753	-11,432
Total nonagricultural employment, 1950	25,631	16,287
Total nonagricultural employment, 1959	33,714	23,518
Per cent change from 1950	32	44
Total increase in nonagricultural employment, 1950-1959	8,083	7,231
New employment in basic industry, 1950-1959	2,907	8,105
Change in total employment, 1950-1959	5,330	4,201
Change in service employment 1/	5,176	-874
Change in population, 1950-1959	14,955	-16,696

Source: Elliot, John Jr., Unpublished Master of Agriculture Paper, Agr. Econ. Dept., Auburn University, June, 1964.

1/ Increase in nonagricultural employment minus new employment in basic industry.

A loss of 11,432 agricultural workers and a gain of 7,231 nonagricultural workers resulted in a net decline of 4,201 workers in the rural area. A corresponding population decline during the period of 16,696 people indicated that for each net loss of 100 workers a population decline of 394 people occurred. Based on this ratio, which does not take into consideration differences in family size of in-migrants and out-migrants, the new nonagricultural jobs prevented a further population decline of approximately 28,000 people from the rural area.

Tuscaloosa County experienced a different situation. Agricultural employment declined by 2,753 workers, but nonagricultural employment increased by 8,083 workers, resulting in a net increase of 5,330. A corresponding population increase of 14,955 people during the 10-year period means that each 100 net increase in workers in Tuscaloosa County resulted in a population increase of 280 people.

Effects of Agricultural and Industrial Development Upon Service Employment

Data in Table 1 also illustrate the effects of development upon service employment in the rural and urban counties. An unusual situation existed in the rural counties during the period of 1950-1959. Although new or expanded basic industry had a reported increase of 8,105 new workers, the net reported increase in nonagricultural employment was only 7,231. The hypothesis suggested here is that service or market-related employment actually declined because of the decline in agricultural employment. As a result of 11,432 workers leaving agriculture, total employment in the rural area declined by 4,201. Therefore, new basic industrial employment did not have the multiplier effect upon service employment that it might have had if agricultural

employment had remained stationary rather than declining. Service employment was estimated to have declined by more than 800 jobs, Table 1. This is in direct contrast to what might have been hoped for by planners interested in development.

The effects of basic industrial development on service industry in Tuscaloosa County were much more positive than in the rural area. An estimated 2,907 new jobs were created by basic industry between 1950-1959. During the same 10-year period, total nonbasic and nonagricultural employment increased by an estimated 5,176 jobs. On this basis, each 100 new basic industry jobs resulted in 178 new jobs in service employment. This estimate is, however, biased upwards because of institutions in the county, principally the University of Alabama, which have grown without regard to growth in basic industry and which probably exerted a strong influence on the growth of service employment.

Capital Investment per Worker and Type of Industry

The amount of capital investment required per worker employed is an important guide for groups planning economic development programs. The information provides a basis for determining capital needs and expected employment as an outgrowth of investment. As in the case of employment, there were significant differences in capital investment between the rural and urban counties, Table 2. During the period 1940 through 1962, capital investment per new worker in the rural area ranged from $909 in the apparel industry to $12,499 in the chemical industry. The average investment for all industry in the area was $2,282 per new worker. The apparel industry provided a major part of rural new employment throughout the period.

TABLE 2. Capital Investment in Basic Industry Per New Worker in Tuscaloosa, Fayette, Lamar, Winston, Pickens and Marion Counties from 1940 to 1962

Name of industrial group	New firms or expansions		New employees		Total new capital investment[1]		Average new investment per new employee	
	1940 to 1962		1940 to 1962		1940 to 1962(Dol.)		1940 to 1962(Dol.)	
	Rural Five County	Urban Tusca-loosa	Rural Five County	Urban Tusca-loosa	Rural Five County	Urban Tusca-loosa	Rural Five County	Urban Tusca-loosa
Agricultural processing	15	6	506	65	1,037,500	430,000	2,050	6,615
Textile mill products	1	1	50	50	500,000	250,000	10,000	5,000
Apparel and related products	30	4	6,135	105	5,574,000	100,000	909	952
Lumber and wood products	24	12	942	264	1,634,000	523,500	1,735	1,983
Furniture and fixtures	3	5	177	115	180,000	330,000	1,017	2,870
Paper and allied products	1	3	300	1,750	3,500,000	20,275,000	11,667	11,586
Chemical and allied products	6	10	245	560	3,050,000	12,535,000	12,449	22,384
Rubber and plastic	2	5	175	1,050	225,000	17,345,000	1,286	16,519
Concrete, plaster and bric, products	7	6	175	100	455,000	172,500	2,600	1,725
Structural and fabricated metal	4	5	435	695	1,293,000	5,715,000	2,972	8,223
Electircal products	3	8	780	255	5,150,000	590,000	6,603	2,314
Petroleum, coal, and mineral	4	6	150	298	380,000	1,900,000	2,533	6,376
Total	100	71	10,070	5,307	22,978,500	60,166,000	2,282[3]	11,337[4]

Source: Elliot, John, Jr. Unpublished Master of Agriculture Paper, Agr. Econ. Dept., Auburn Univ., June, 1964.

1/ Investments in factory expansions are not separated from investments in entirely new plants.

2/ Average new investment per worker.

3/ Average new investment per worker.

Average investment per new worker in the rural five counties tended to increase during the periods studied. Between 1940-1944 an average investment of $807 per new worker was made. Amounts changed as follows: For successive 5-year periods, the investment per new worker was $1,557 (1945-49); $3,061 (1950-54); $1,339 (1955-59). But, during the 3-year period 1960-62, the amount invested appeared to be approaching the 1950-1954 level. The average rate of increase in new investment was about $120 per new worker each year.[1/] The period of highest investment per new worker, 1950-1955, was a time of expansion in the paper, chemical, and electrical industries. During the next period, 1955-1959, low investment per new man in the apparel industry accounted for most of the new development which explains the sharp drop in investment per worker during that period.[2/]

Investment per new worker in Tuscaloosa County was not analyzed by 5-year time periods because of the confidential nature of information on number of employees in certain industries. The following inferences, however, were made: Investment per new worker was observed at $8,380 in the period 1940-1945 and from 1960 through 1962 the amount was $43,820 per new worker. This would represent a large increase through time in Tuscaloosa County if the 1960-1965 average per new worker remains anywhere near $40,000. Average investment per new worker was $11,337 for the 23-year period and 5 times greater than the same long-term average in the rural area.

1/Regression estimate.

2/ The data were not deflated and therefore included the effects of inflation and increased automation.

Investment per new worker in apparel manufacturing has been quite stable through time, whereas industries in the urban county, such as chemical, paper, electrical machinery, and rubber, have steadily increased investment per new worker. As investment per new worker has increased in Tuscaloosa County, the number of new workers in basic industry has shown a tendency to decline at an average rate of approximately 130 new workers per year.[1/] This does not mean that total number of new workers was declining but the yearly increase was smaller each year. This is in direct contrast to the rural area where, although investment per new worker increased on a small scale, the yearly increase of new workers in basic industry other than agriculture has been larger each year. New jobs have increased in the rural counties at an average rate of about 188 per year.[2/]

The difference in the way new jobs are increasing is also shown in off-farm employment opportunities for farmers. Although the number of farms in both areas declined by 49 per cent during 1950-1959, opportunities for off-farm employment appeared more favorable in the rural counties. The number of farmers employed off the farm more than 100 days decreased by 31 per cent in Tuscaloosa and by only 17 per cent in the rural counties, Table 3.

Under some conditions of development, off-farm employment would be expected to increase as shown in a study of Indiana development by Stevens and Wallace (4). Rural counties in that state have had absolute increases in number of off-farm workers as well as small increases in the percentage

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1/Regression estimate.

2/Regression estimate.

TABLE 3. "Off-Farm" Employment Characteristics of Farm Operators in Tuscaloosa County and the Five-County Area of Lamar, Marion, Pickens, Winston, and Fayette Counties

County and year	Total farms 1/	Farmers reporting 100 or more days of "off-farm" employment	
Tuscaloosa	No.	No.	Pct. of all farms
1949	3,806	1,166	31
1959	1,907	808	42
Net Change	-1,899 (-49%)	-358 (-31%)	11
Five-County Area			
1949	13,813	3,005	22
1959	7,094	2,502	35
Net Change	-6,719 (-49%)	-503 (-17%)	13

Source: U. S. Bureau of Census, U. S. Census of Agriculture, 1959, Vol. I, part 32, County Tables 1 and 4; U. S. Bureau of Census, U. S. Census of Agriculture, 1950, Vol. I, part 21, County Table 1.

1/ Adjusted for change in definition of a "farm."

of farmers working off the farm. The situation in that state seems to be that urban development offers more part-time work to farmers who intend to stay in farming. Perhaps one of the most significant differences between Indiana and Alabama conditions was the far greater number of Alabama farms in 1950. The counties studied by Wallace and Stevens were approximately the same size as the Alabama counties discussed in this report and under present conditions counties in both states appear to be approaching approximately the same number of farms per county. However, during the 1950-1959 decade, farms in Alabama declined in number at least two and one-half times as fast as in Indiana.

Apparently, the combination of industrialization and farm size in Alabama has meant that many part-time farmers have been willing to abandon farming in response to urban development and non-farm employment opportunities. There are some indications this will continue to be true. (See the appendix.) In the counties of this study, the rate of farmers working off the farm 100 days or more, 35-42 per cent, Table 3, indicates a level of underemployment in farming that is high in relation to Indiana conditions. Another indication of underemployment is given by Bishop. In 1960 there were 17 farm males between the ages of 10-19 for each retirement age farmer in the South who was operating a farm with $10,000 or more of marketings (5). This relationship holds to a similar degree in Alabama.

Some Prospects for the Future

Many of the elements of change noted in this report have been cataloged previously. The decline in number of farms and farm workers, increased industrialization, and increased investment per worker have become

almost commonplace facts. However, data shown here with respect to new workers employed is slightly at variance with the accepted concept of nodal economic growth. According to the nodal concept, growth at a central place builds at a faster rate than the surrounding areas because of complementarity among industries and because future investment and employment decisions are likely to be dependent on the extension of existing plant and equipment. Although new jobs have been increasing in both the rural and urban areas, large increases in investment per worker in the urban area have been associated with new jobs increasing at a decreasing rate, whereas jobs in the rural area have been increasing at an increasing rate. This is probably one indication of the strong resistance many farmers have against moving from their home community. Also, it probably reflects the increased employment of rural women in the labor force.

Decentralized growth in employment activity in the rural area may receive added stimulus in the future from increased growth in the service industries. As shown by this study, the effect of basic industry on service employment (the multiplier effect) has been essentially zero in the past because of the rapid exodus of agricultural workers from farms. This decline may not continue at the same pace in the future if we accept the Indiana conditions as representative of a more advanced relationship between industry and agriculture. However, with a high rate of underemployment still indicated among farm operators and farm youth, Table 3 and the Appendix, there will be continuing attractions in the rural area for labor oriented basic industry. The added stimulus of multiplier effects on sales and employment in rural county service industries is expected on the premise that basic industry other than agriculture is becoming the major determinant of population.

One of the more interesting factors within the entire overall structure of change has been the relation of agricultural incomes to those in the rest of the area economy. In 1939 and 1957, personal income per farm operator in the rural area was related to per capita personal incomes of non-farmers in the rural counties in essentially the same proportions. Relative shares of personal income between the farm and nonfarm segments of Tuscaloosa County were also about the same in the two time periods (6) (7). These facts lead to a hypothesis that regardless of the extremely different types of general development in rural and urban areas the relative position of farm incomes has been unaffected. For those interested in agricultural development this hypothesis raises a serious question. Many observers have felt that rapid migration of "surplus" farmers into a rapidly growing economy is the solution to many of our "farm problems."

Farm income has increased, but relative farm income improvement has not yet taken place in the presence of urban development. There is little evidence that the labor market is working differently than it did in 1939.

Summary

The implications of this report are several:

(1) Service employment and service industry growth has been lower than might have been expected in rural counties because of greater off-farm migration that has not been absorbed by local basic industry. Demand for services in rural counties will increase rapidly as basic industry other than agriculture is at this time becoming the basis of population.

(2) Geographically, the growth pattern in employment has been decentralized. Employment increase apparently has been as good or better in the rural counties as in the nodal urban county.

(3) Data on off-farm employment indicate that a considerable pool of potential industrial labor still exists on the farm. Counties with high rates of off-farm employment are indicated in the appendix to the report.

(4) The issue is still in doubt whether urban development has affected the returns to labor in agriculture relative to non-farm labor.

The very close relationship between industrial growth and agriculture has been shown throughout the study. The conclusion that much of the growth in recent years has resulted from mobility of farm labor to new occupations will not be questioned by many, although the capital-labor ratio has increased significantly in the urban area. Mobility of labor into new occupations has been a mainspring of growth. Furthermore, the costs of retraining for new jobs has probably been small as witnessed by the type of industrial development.

We must expect that mobility of labor into new occupations can continue to be an important source of economic growth. This source will be denied, however, if proper attention is not given to the ever increasing difficulty of job mobility in a developing society. As an example, 5,000 computer programmers will be much more difficult to obtain from the ranks of industry than were 5,000 pulp and paper mill employees obtained from agriculture. The implications are that adult education and on-the-job training are rapidly becoming more important if we are to effectively employ the development of new technology requiring new skills, and by doing so avoid technological unemployment.

LIST OF REFERENCES

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(3) Andrews, Richard B. 1963. Economic Planning for Small Areas an Analytical System, Land Economics, Vol. 39, No. 2, (143-155).

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(6) U. S. Census of Agriculture, 1945, Vol. 1, part 21, Statistics for Counties, U. S. Census of Agriculture, 1959, Vol. 1, Part 35, Statistics for Counties.

(7) Personal Income in Alabama Counties Since 1939. Marion Hawley, Bur. of Bus. Res., Univ. of Alabama.

Appendix

This appendix contains a table comparing the number of farmers working off the farm 100 days or more in a census year and the decrease in number of farms in the following census year. Census data for the period 1954-1964 is listed by county in Table 1.

A statistical analysis of the data in the Appendix Table indicates that for 3 additional "off-farm" workers at least 1 farmer will abandon farming. This estimate takes trend into account since it can be seen in the 1954-59 data that in many cases a 1 to 1 ratio appears to have existed. Number of farms, however, is affected by more forces than the availability of off-farm work and this is an area for future work.

Appendix Table. Changes in Number of Off-Farm Workers and Net Decreases in Farms for 67 Counties in Alabama

Counties	Off-Farm workers1/ 1954	Decrease in farms2/ 1954-59	Off-Farm workers 1959	Decrease in farms 1959-64	Off-Farm workers 1964
Autauga	591	335	438	219	400
Baldwin	1,098	739	802	+253/	859
Barbour	458	715	417	484	320
Bibb	442	452	318	110	293
Blount	1,100	1,479	760	209	826
Bullock	353	503	311	167	297
Butler	828	597	533	247	490
Calhoun	1,102	830	590	218	484
Chambers	840	870	430	347	378
Cherokee	591	550	461	478	375
Chilton	1,097	878	897	388	699
Choctaw	945	842	583	333	520
Clarke	876	1,000	557	408	431
Clay	942	961	429	116	418
Cleburne	601	638	306	110	298
Coffee	454	891	470	484	451
Colbert	822	690	585	241	495
Conecuh	735	872	477	364	390
Coosa	765	697	327	83	330
Covington	737	928	619	487	600
Crenshaw	370	526	353	435	294
Cullman	1,357	1,927	1,274	659	1,240
Dale	384	473	335	188	332
Dallas	963	1,327	720	751	556
Dekalb	1,310	1,584	1,344	1,036	1,143
Elmore	1,126	920	799	434	611
Escambia	603	651	440	176	392
Etowah	1,520	1,221	886	237	877
Fayette	535	764	421	283	441
Franklin	870	733	676	239	633
Geneva	244	604	374	436	362
Greene	399	604	435	233	360
Hale	544	791	460	408	431
Henry	186	501	264	372	240
Houston	397	918	394	457	409
Jackson	858	1,060	889	518	805
Jefferson	1,795	2,092	523	118	541
Lamar	545	949	395	170	406
Lauderdale	1,618	1,144	1,291	481	1,059
Lawrence	756	1,006	721	381	711
Lee	839	762	609	459	307

Continued

Appendix Table 1. Continued

Counties	Off-Farm workers1/ 1954	Decrease in farms2/ 1954-59	Off-Farm workers 1959	Decrease in farms 1959-64	Off-Farm workers 1964
Limestone	874	1,512	814	648	727
Lowndes	559	649	482	121	474
Macon	523	306	553	376	377
Madison	1,017	1,510	966	1,272	631
Marengo	857	1,284	539	218	570
Marion	733	931	570	322	566
Marshall	968	1,558	1,068	533	1,049
Mobile	1,561	922	1,058	246	827
Monroe	847	984	564	392	508
Montgomery	707	722	641	336	519
Morgan	1,125	1,217	1,112	456	1,052
Perry	601	762	326	276	317
Pickens	631	1,054	664	273	519
Pike	309	752	358	392	370
Randolph	735	872	624	353	548
Russell	626	496	433	339	275
St. Clair	842	938	512	247	388
Shelby	831	625	468	70	457
Sumter	614	878	471	311	442
Talladega	1,152	1,025	661	217	561
Tallapoosa	976	951	617	281	505
Tuscaloosa	1,430	1,632	808	596	567
Walker	1,266	1,419	852	473	577
Washington	761	484	557	247	464
Wilcox	626	1,004	512	287	456
Winston	647	687	452	37	450
Total	53,316	60,459	39,723	23,283	34,841
Av./per county	808	916	603	353	528

1/ The number of farm workers working off the farm 100 days or more.

2/ The net decrease in number of farms in the 5-year census period following the observed number of off-farm workers.

3/ Baldwin County was the only county in Alabama that has shown an increase in number of farms.

SOURCE: U. S. Census of Agriculture, 1959, Statistics for Counties, Table 5 and Preliminary U. S. Census of Agriculture, 1964.