

1963

# Land, labor, capital and management in Iowa farming

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LAND, LABOR, CAPITAL AND MANAGEMENT  
IN IOWA FARMING 3)

by

Arlo James Minden

A Thesis Submitted to the  
Graduate Faculty in Partial Fulfillment of  
The Requirements for the Degree of  
MASTER OF SCIENCE

Major Subject: Agricultural Economics

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Signatures have been redacted for privacy

Iowa State University  
Of Science and Technology  
Ames, Iowa

1963

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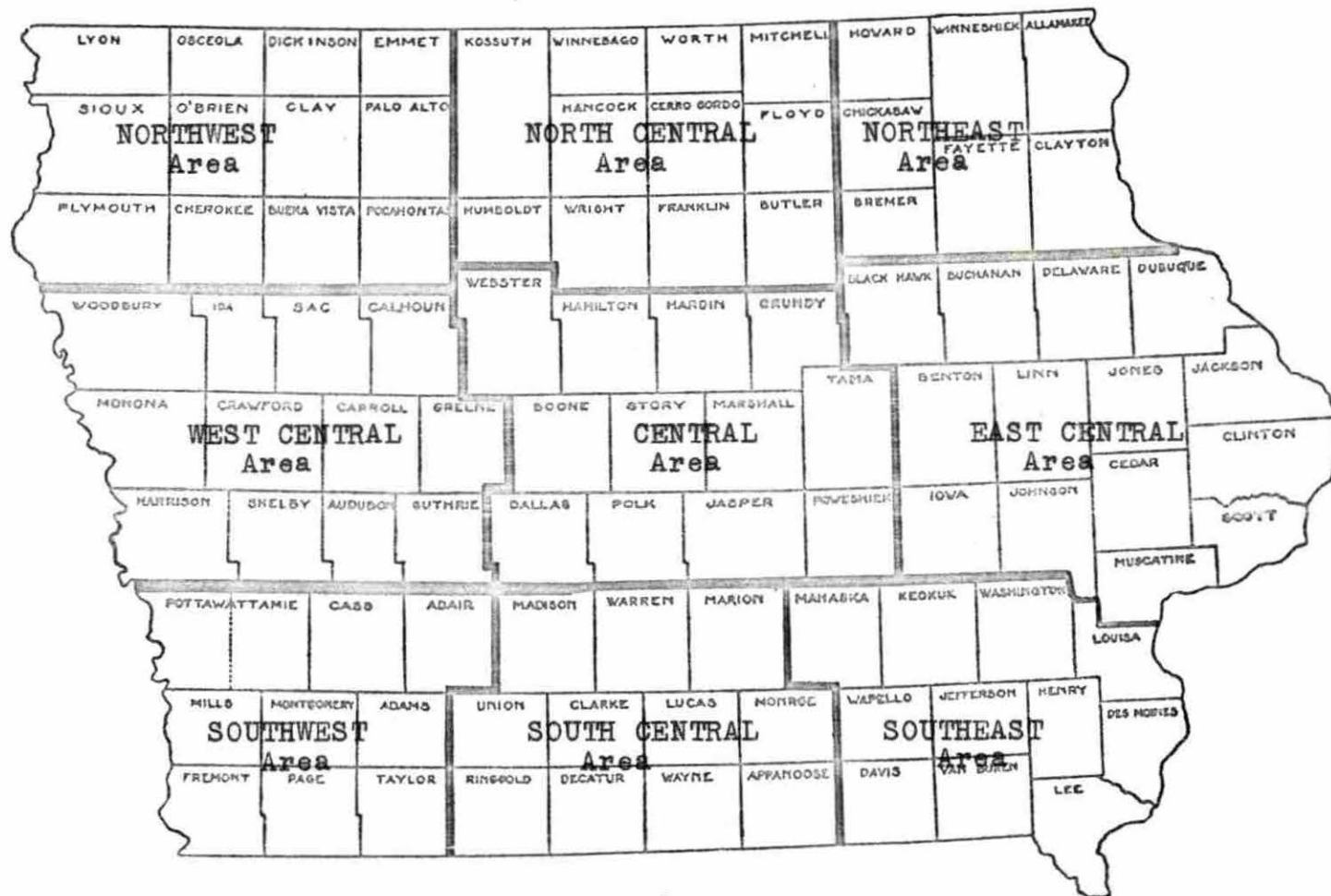
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## IOWA COUNTIES

<u>County Name</u>	<u>County No.</u>	<u>County Name</u>	<u>County No.</u>
Adair	1	Hancock	41
Adams	2	Hardin	42
Allamakee	3	Harrison	43
Appanoose	4	Henry	44
Audubon	5	Howard	45
Benton	6	Humboldt	46
Black Hawk	7	Ida	47
Boone	8	Iowa	48
Bremer	9	Jackson	49
Buchanan	10	Jasper	50
Buena Vista	11	Jefferson	51
Butler	12	Johnson	52
Calhoun	13	Jones	53
Carroll	14	Keokuk	54
Cass	15	Kossuth	55
Cedar	16	Lee	56
Cerro Gordo	17	Linn	57
Cherokee	18	Louisa	58
Chickasaw	19	Lucas	59
Clarke	20	Lyon	60
Clay	21	Madison	61
Clayton	22	Mahaska	62
Clinton	23	Marion	63
Crawford	24	Marshall	64
Dallas	25	Mills	65
Davis	26	Mitchell	66
Decatur	27	Monona	67
Delaware	28	Monroe	68
Des Moines	29	Montgomery	69
Dickinson	30	Muscatine	70
Dubuque	31	O'Brien	71
Emmet	32	Osceola	72
Fayette	33	Page	73
Floyd	34	Palo Alto	74
Franklin	35	Plymouth	75
Fremont	36	Pocahontas	76
Greene	37	Polk	77
Grundy	38	Pottawattamie	78
Guthrie	39	Poweshiek	79
Hamilton	40	Ringgold	80

## Iowa Counties (continued)

<u>County Name</u>	<u>County No.</u>	<u>County Name</u>	<u>County No.</u>
Sac	81	Warren	91
Scott	82	Washington	92
Shelby	83	Wayne	93
Sioux	84	Webster	94
Story	85	Winnebago	95
Tama	86	Winneshiek	96
Taylor	87	Woodbury	97
Union	88	Worth	98
Van Buren	89	Wright	99
Wapello	90		



Areas of Iowa

## INTRODUCTION

American agriculture has undergone significant structural and organizational change since the early colonial period when it was the only major sector of the economy. As the nation grew and other industrial sectors were added, the relative importance of agriculture as a source of income for the nation's population, its influence in political affairs and on economic growth and development gradually decreased. While the processes of economic progress are expected to reduce the influence of agriculture relative to that of other industries, serious problems for the agriculture sector have resulted from those processes.

The kinds of problems with which the agricultural industry has been concerned have varied over time. Such problems as land settlement, supply shortages and market development have been replaced as top priority problem areas by such current concerns as declining farm incomes and oversupply. These last two items have been referred to in an aggregative sense, in recent years, as the farm problem.

There is evidence that the changes occurring in agriculture have accelerated during the past three decades especially and that they have had a very noticeable impact on the quantity of and allocation of resources on a competitive farm business. Furthermore, it seems likely that future changes in farming will be more diverse and far reaching than in the recent past.

A study of the past and present organization of agriculture and of the resource allocation within agriculture would provide useful data for appraising the current situation and formulating expectations for the future. It would be helpful to know how much land, labor, capital and management is combined in a typical farm business. Recent changes in resource allocation would provide a basis for predicting changes in resource use in the future. Such evidence for the nation as a whole would be desirable but such a study would be voluminous and time consuming. Besides, there are some advantages to restricting an investigation to a more limited area, such as a state, since presumably significant differences exist among them.

The present investigation, therefore, is restricted to the state of Iowa, within the national setting. The past, present and future use of the major resources of land, labor, management and capital are examined and their implications assessed in terms of such things as opportunities for farm boys to become farm operators, capital requirements, farm consolidation and managerial knowledge. The findings should be useful to persons involved in education, research and extension as well as to farmers and farm youth.



## REVIEW OF LITERATURE

One of the most persistent and apparently one of the most difficult problems to solve in the United States has been and is that problem reflecting the general situation in the agricultural sector of the national economy. For nearly four decades the agricultural sector has faced serious problems. During the nearly 40 years from 1920 to 1960, the situation in agriculture, commonly referred to as the "farm problem", has been the central theme of many studies conducted by agricultural economists. It has also been the reason for legislative attempts at establishing a fair and equitable governmental agricultural policy. In addition to economists and legislators, farmers, both individually and as organized groups, have at least verbally expressed concern with the changes which have been offered to remedy the farm problem and bring agriculture back into balance with the rest of the economy.

## Agricultural Programs

The period of the late 1920's saw the first signs of governmental concern for a problem which was to harass policy makers for many years. Problems facing agriculture during the late 20's were not greatly different than those that the farmer faces today. Then as now the demand for agricultural products was declining, factors of production were priced

quite high, and supply of farm products was in excess of the demand for these products.

The Agricultural Marketing Act of 1929 provided for the establishment of the Federal Farm Board. As a result the government was involved in trying to help the farmer through compensation programs of one type or another. The Federal Farm Board was organized to discourage speculation, prevent inefficiency and wasteful methods of distribution, aid organized producer groups in marketing, create producer owned cooperatives and aid in the control of surpluses.<sup>1</sup> The attempt of the Federal Farm Board at price supports via storage activities enjoyed little or no success. As Shepherd indicates, this was a poor time to start a price support program because the industrial depression began that same year.<sup>2</sup> With generally depressed prices resulting from the depression any attempt to keep the prices of a particular commodity high was faced with failure. This was especially true in the case of food products. Although the Federal Farm Board failed, it set the stage for continued governmental help for the farmer.

The establishment of the Commodity Credit Corporation was another attempt to strengthen the position of agriculture.

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<sup>1</sup>Earl O. Heady. Agricultural policy under economic development. Ames, Iowa, Iowa State University Press. 1962. p. 28.

<sup>2</sup>Geoffrey S. Shepherd. Farm income policy: a long run approach. Unpublished manuscript. Ditto. Ames, Iowa, Department of Economics, Iowa State University of Science and Technology. pp. 12-13. ca. 1962.

While the Commodity Credit Corporation (CCC) is still actively engaged in storage programs for surplus commodities, it is greatly changed in scope from the time it was initiated. There are varying opinions among persons concerned with the farm problem and agricultural policy as to the success or failure of the CCC.<sup>3</sup> It may be that if the storage programs of the CCC had not been in effect, agriculture would have experienced greater pressure from declining commodity prices. On the other hand, if a completely free market had been allowed, the adjustments in agriculture might have been implemented much more rapidly.

The Agricultural Adjustment Act of 1933 was an early attempt at acreage control as a remedy for the farm problem. The Soil Bank, Conservation Reserve and the Emergency Feed Grains programs of the early 1960's were basically acreage control programs also. However, the method of implementation was different for each program.

#### Food Problem or Farm Problem

The situation in agriculture today is not good. Farmers are faced by high factor prices and low product prices. This coupled with the low elasticity of both supply and demand has caused a very unstable income situation for the farmer. Farm

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<sup>3</sup>David George Patterson. Size and location of stabilization stocks of corn. Unpublished M. S. thesis. Ames, Iowa, Library, Iowa State University of Science and Technology. 1942. pp. 26-28.

labor is presently not earning returns comparable to the returns earned by equally capable labor in the non-farm sector. The various governmental agricultural programs have not eliminated the problems in agriculture.

Studies by Clark, Gittinger, Barlowe, Heady and others have established quite certainly that as a country experiences economic progress, problems in the agricultural sector are inevitable. As the forces of increasing supply of and decreasing demand for farm products are brought to bear by the price system, great changes must take place in the basic structure of the agricultural society.

T. W. Schultz suggests that, typically, poor countries face a food problem and rich countries face a farm problem.<sup>4</sup> A food problem is characterized by the situation in which demand for food is in excess of the supply of food. Often the supply of food is below the subsistence level. Economic progress is very difficult to initiate and perpetuate in areas where the domestic food supply is at the subsistence level or below. Governmental foreign aid programs have helped alleviate the food problem in many foreign countries.

The United States, taken as a whole does not face a food problem, but rather a farm problem. A farm problem may be

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<sup>4</sup>Theodore W. Schultz. The United States farm problem in relation to the growth and development of the United States economy. In United States Congress. 85th. 1st session. Joint Economic Committee. Policy for commercial agriculture. pp. 3-14. Washington D.C., U.S. Government Printing Office. 1957. p. 3.

described basically as the condition existing when an abundance or more accurately an excess of basic food items is produced. Many products in addition to food may be found in excess. Increases in farm population in addition to that needed to maintain the production process may, under conditions of existing underemployment of labor, complement the farm problem. Prices of farm products are in many cases considered to be inadequate. Low farm product prices result in low incomes to farmers. Low incomes in the farm sector are typical of a farm problem. Plunging farm incomes, when measured with respect to incomes of the industrial sector, characterize an unhealthy situation when the welfare aspects of the farm problem are considered. As mentioned earlier, surplus production may prevail when farmers are having trouble maintaining satisfactory levels of living. The accumulation of costly surpluses does nothing to eliminate the farm problem. The problem in United States agriculture is of a very diverse nature covering a wide range of conditions.

Let us consider the characteristics of the farm problem as outlined above. A wealth of food and many other products is the case in a "rich country". Today, on the average, every farmer in the United States produces food for slightly more than 26 people. The development of this condition has contributed noticeably to the standard of living presently enjoyed by the United States consumer. While the ability to produce at this level or rate is a marvel in itself, there have been

serious repercussions to the farmer.

Since the birth rate among farm families is greater than that needed to maintain efficient agriculture production, problems of labor transfer are brought to the fore. We don't need an increase in the number of farmers. Logically, the productivity of the labor force in agriculture will not be increased by net additions to that labor force under the existing conditions of low elasticity of demand for farm labor. Low farm product prices will lower farm incomes unless changes in factor productivity, input costs and effective consumer demand are sufficient to counteract their effect.

The accumulation of costly surpluses has been as a result of the fact that the supply of farm products has been exceeding the demand for farm products by from 6% to 8% per year in recent years.<sup>5</sup> The costs of the accumulation of these surpluses has been the result of efforts by the government to keep them off the market. A study by Shepherd and others indicates that if the surpluses of feed grains that existed in 1959 were released on the open market, prices for those commodities would fall drastically.<sup>6</sup>

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<sup>5</sup>Karl Fox. Demand expansion and agricultural adjustment. Iowa State University of Science and Technology. Center for Agricultural Adjustment. CAA Report 2: 123-153. 1959. p. 123.

<sup>6</sup>Geoffrey Shepherd, Arnold Paulsen, Francis Kutish, Don Kaldor, Richard Hiefner, and Gene Futrell. Iowa Agr. and Home Ec. Expt. Sta. Special Report No. 27. 1960. pp. 5-20.

## The Farm Problem Defined

Several legislative attempts have been made to solve the farm problem. However, these attempts have failed. The main reason for their failure is that the governmental programs for agriculture have not been constructed to deal with the whole problem facing agriculture. Most of the programs which have been put into action have been based on the thesis that the real problem of the farmer is a price problem.

The farm problem is not just a price problem but rather several problems so closely related that individual distinction is difficult if not impossible. Shepherd suggests that the farm problem is really an aggregation of the following:

1. agricultural product price instability
2. existing rural poverty
3. over-production
4. low farm incomes relative to incomes in the non-farm sector.<sup>7</sup>

The nature of the farm itself implies that the problems which it faces are not of one specific origin. The farm firm faces the problems of the producing unit. It must continually adjust to the changes in effective consumer demand for its products. On the other hand, the farm household is a consumer.

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<sup>7</sup>Geoffrey S. Shepherd. Farm income policy: a long run approach. Unpublished manuscript. Ditto. Ames, Iowa, Department of Economics, Iowa State University of Science and Technology. ca. 1962. p. 2.

The household must allocate its resources to obtain maximum satisfaction from its dollar. Acting as both consuming and producing units, the farm is subject to the strains and stresses of supply and demand as they are reflected in factor and product prices.

Many respected authors feel that the problem facing agriculture is of a more specific origin. T. W. Schultz says the, "hard core of the farm problem is a labor transfer problem."<sup>8</sup> There may be justification for taking this view. The disparity between the value productivity of labor employed in agriculture and the value productivity of labor in non-farm employment should be given careful consideration. Overpopulation and underemployment has depressed the marginal product of farm labor. If the underemployed labor in agriculture were to be transferred to productive effort in alternative employments, the problems of labor value productivity in agriculture would be eased. The question at this point is whether or not inefficiencies in labor allocation are the only major causal factor.

D. Gale Johnson finds general agreement with the conclusions reached by Schultz. He suggests more emphasis and study on the labor mobility consideration.<sup>9</sup>

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<sup>8</sup> Schultz. op. cit. p. 14.

<sup>9</sup> D. Gale Johnson. Farm prices, resource use and farm income. In United States Congress. 85th. 1st session. Joint Economic Committee. Policy for commercial agriculture. pp. 448-458. Washington D.C., U.S. Government Printing Office. 1957. pp. 449-450.



Other economists suggest that perhaps more consideration should be given to income as the major factor influencing the situation in agriculture. Technological innovations and many other phenomena have been offered as the major causal factor.

A logical question that should be answered at this point is which of these hypotheses is correct. Apparently none of these explanations is incorrect. While these hypotheses vary in completeness, most of them can be supported quite soundly.

The distinction between problems arising from resource allocation difficulties and problems arising from growth of resource and availability is not very clear.<sup>10</sup> Realization of the vague definitional aspects of the farm problem is essential in understanding the diversity in remedial measures proposed.

The farm problem may be described as a complex of socio-economic relationships. Although making specific reference to labor relationship, Johnson agrees that consideration must be given to other than purely economic relationships.<sup>11</sup> When attempting to analyze the general problem facing an entire sector of the nation's economy, failure to take an interdisciplinary approach will eliminate some very important elements from consideration.

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<sup>10</sup>Peter T. Bauer and Basil S. Yamey. The economics of under-developed countries. Chicago, Illinois, the University of Chicago Press. 1957. p. 10.

<sup>11</sup>Johnson. op. cit. pp. 21-27.

## Economic Growth and Progress

The interrelationships between the position occupied by agriculture and the phenomenon of economic progress are extremely complex. Before attempting discussion of these relationships, a review of terms or concepts will be helpful. Economic growth as viewed by this study, as well as authors in the field, is interpreted as an aggregative concept. The implication of economic growth is for a general increase in total output of the economy. Economic progress is interpreted as referring to an increase in real income measured on a per capita basis.

While economic progress, as previously defined, is often referred to as a desirable condition, this need not and indeed is not the case in many instances. Acceptable social welfare is offered where all sectors are experiencing improved levels of utility. Economic growth is only one of the elements of the social welfare function. An increase in economic growth, aggregate output, need not yield an increase in social welfare. Just as economic growth is an element of the social welfare function, economic progress is an element of the growth function. Economic progress, rising real per capita income, is a specific subset of economic growth and hence of the social welfare function. Economic progress should be considered not as an end in itself, but as a means to desired ends or goals.

Colin Clark has indicated the importance of economic

progress in analysis of dynamic economics with the statement, "The basic dynamic factor in a progressive economy is the rise in real per capita income."<sup>12</sup>

Economists of the classic school, especially Malthus, rejected any possibility of increased real per capita income. Accordingly any increase in real per capita income above the minimum subsistence level would be completely offset by increases in population. Of course failure to consider technology explains much of the error in this line of reasoning.

Historically, as economic progress and growth are experienced by a country many adjustments in interindustry resource allocation are necessitated. Low levels of economic welfare are associated with a high proportion of the resource complement of a given country being employed in primary industry.<sup>13</sup>

Only a brief look at countries such as China, India and South Korea will reveal that these poor countries are engaged chiefly in primary industry. In many of the poor countries of the world in excess of 70% of the labor force is employed in agriculture. The United States was typical of this situation during the early years of its existence also. As the United States has developed emphasis has shifted from primary industry

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<sup>12</sup>Colin Clark. The conditions of economic progress. 2nd ed. London, England, Macmillan and Co., Ltd. 1957. pp. 1-18.

<sup>13</sup>R. M. Ojala. Agriculture and economic progress. London, England, Oxford University Press. 1952. p. 2.

to secondary and tertiary industries.\* Progressive economics tend to develop more secondary and tertiary industries rather than primary industries. Economic progress has been reflected by this shift in types of production in some countries. Changes in resource allocation is essential before this shift can be facilitated.<sup>14</sup>

#### The United States Agricultural Situation

Our discussion thus far has been in quite general terms. Now consideration must be given to factors and observations which will offer a more precise explanation of the difficulties facing United States agriculture in general and set the stage for analysis of the situation confronting agriculture in the state of Iowa.

The increased productivity of major resources employed in agriculture has figured importantly in the industrial boom which has been taking place in the United States. This contribution is noticeable on basically two fronts. First, increased productivity in the farm sector has provided an abundance of basic food products. Second, increased labor productivity has released labor from the farm sector to be employed

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<sup>14</sup>Clark. op. cit. pp. 490-521.

\*A primary industry produces commodities from natural resources. The products of a primary industry is often consumed without further processing. A secondary industry produces products developed from inputs from other industries, mostly primary. Manufacturing is an example. Tertiary industry is basically service oriented.

in the industrial sector. Failure of many nations to develop industrially may be traced to stagnation of resources employed in agriculture.

Our concern is more specifically with the actual changes in major resource productivity in agriculture. Major resources as used here refers to land, capital, labor and management. Changes in the relative productivity in any one or more of these major resources implies needed adjustments in allocation.

During the past three decades, farm production per unit of resources employed has increased a great deal. Since the late 1800's agricultural output has been increasing steadily. The only major interruption of this trend was during the early 1930's --- the era of the great depression. Agricultural output today is over 500% greater than it was in the late 1870's.<sup>15</sup>

Realizing that the upward trend in aggregate output from agriculture has been in existence for a number of years, it is necessary to note that the increase in output has been more pronounced since World War II than before the war. Rapid increase in the adoption of technological innovations has been offered as the most accurate explanation of the increased output. The demands of war called forth tremendous efforts to increase productivity in agriculture. Technology, a direct

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<sup>15</sup>Glen T. Barton. Trends in agricultural productivity. In United States Congress. 85th. 1st session. Joint Economic Committee. Policy for commercial agriculture. pp. 15-25. Washington D.C., U.S. Government Printing Office. 1957. p. 15.

result of these efforts, was supplied in large amounts.

Accompanying the upsurge in productivity following World War II was a decline in the percentage of total population employed in agriculture. The supply of farm products exceeded the effective demand for farm products. The basic difficulties of the farm sector were beginning to take shape.

Beginning in 1940 rapid increases in agricultural output were observed. Since that time output per man hour has doubled. An increase of nearly 40% in output has been experienced with about 30% fewer man hours.

During the period 1941 to 1951 farm output increased 24%. This increased product was accomplished with 4% more cropland and with 23% fewer hours of work. However, a 192% large investment in land and other capital goods was observed.<sup>16</sup> Two phenomena are illustrated here. Aggregate farm output increased in spite of the fact that the labor force declined. While the farm labor force was declining, the people remaining on farms increased their utilization of capital items nearly 200%. There have been very noticeable changes in resource allocation in the period since World War II.

Between 1870 and 1940 the population of the United States increased in almost direct proportion to increases in agricultural

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<sup>16</sup>Sherman Johnson and Kenneth Bachman. Recent changes in resource use and in farm incomes. Iowa State University of Science and Technology. Center for Agricultural Adjustment. Problems and policies of American agriculture. pp. 9-27. Ames, Iowa, Iowa State University Press. 1959. p. 13.

production. Since 1940 population has increased about one-eighth while agricultural output has increased about one-third.<sup>17</sup> If a population increase of one-eighth is assumed to increase effective demand for agricultural products by one-eighth, a surplus of agricultural products has been in existence at least since 1940. As noted earlier, however, surpluses in agriculture existed as early as 1929.

Barton suggests that from 1940 to 1955 farm output rose by about 35% while inputs increased by only about 10%.<sup>18</sup> Resource productivity increased by well over 300%. Shepherd includes a chart in one of his studies showing that from 1956 to 1957 alone agricultural output increased by about eight percentage points.<sup>19</sup>

We can say with a great deal of confidence that productivity per unit of resource used has increased very rapidly since about 1940. While there was a general increase in output before 1940, agricultural output virtually exploded after that time. The increase in agricultural productivity has sired and nurtured very severe problems for the farmer.

The problem facing United States agriculture may be viewed "as the result of an interaction between a high rate of

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<sup>17</sup>Raleigh Barlowe. Population pressure and food production potentialities. *Land Economics*. 25: 227-239. 1949.

<sup>18</sup>Barton. *op. cit.* p. 23.

<sup>19</sup>Geoffrey S. Shepherd. *Agricultural price analysis*. 5th ed. Ames, Iowa, Iowa State University Press. 1963. p. 9.

maladjustment creation associated with rapid economic progress and a slower rate of resource adaptation reflecting limited capacity of our economic and social institutions for dealing with the dynamics of growth."<sup>20</sup> Failure to adjust adequately and fully to varying conditions resulting from rapid introduction of new processes and techniques has been the rule rather than the exception. The disparity between rural incomes and non-farm incomes during most of the years from 1940 to 1960 is a case in point.

The processes of economic progress and rising real per capita income have been accompanied by a continuous flow of imbalance creation. Technology has often been considered to be the basic source of disequilibrium creation. There are several aspects of technology of which we should be aware.

As Heady points out, there are basically two type of technological innovations.<sup>21</sup> Mechanical innovations are those which change the method of production but don't change the final product. On the other hand there may be innovations which increase productivity purely from a modification of physiological aspects. These are biological innovations. Of course many innovations exhibit characteristics of both types.

In addition to increasing output, innovations must in-

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<sup>20</sup>Donald R. Kaldor. Adjustment problems in a progressive economy. Iowa Agr. Exp. Sta. Special Report No. 20: 10-16. 1957.

<sup>21</sup>Earl O. Heady. Economics of agricultural production and resource use. Englewood Cliff, New Jersey, Prentice-Hall, Inc. 1961. pp. 818-819.



crease profits or utility, or there would be no reason for the particular innovation to be adopted in the first place.<sup>22</sup> It may very well be the case that innovations increase profits initially. As more people adopt a particular innovation less and less is added to individual profits. Profits may drift upward for an entire sector of the economy as long as the flow of innovations remains continuous. Innovations which are capable of increasing profits in the short run, at least, by increasing the efficiency of factors of production provide a continual flow of disequilibrating forces. Increased profits are often facilitated by shifting the relative marginal products of factors of production. Innovations in agriculture have greatly increased the marginal value productivity of capital inputs relative to the marginal value productivity of labor. As a result more capital is being used relative to labor. It is the failure of agriculture to make shifts in resource allocation fast enough that merits consideration. While the discussion to this point has been in general terms, it has served to introduce and give direction to analysis with respect to each of the major resources: land, labor, capital and management.

Rapid increases in the introduction and adoption of new

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<sup>22</sup>Harl O. Heady. Basic economic and welfare aspects of farm technological advance. *Journal of Farm Economics*. 31: 293-316. 1949. p. 295.

technology is not the only factor yielding disequilibrating forces in agriculture. Natural increases in farm population give rise to serious problems which must be given consideration. Discovery of new sources of natural resources add impetus to the forces creating imbalance conditions. Recognition must be given to changes in the consumer preference pattern.

Innovations may increase output, but at the same time increase costs. This need not be an unhealthy situation as long as output increases at a greater rate than costs. Of course, demand and supply conditions must be assumed constant for the above statement to hold true. Output may be held constant but costs reduced or costs may be held constant as output increases. Any of these relationships may exist.

As mentioned earlier, the nature of the farm subjects it to forces acting from both supply and demand aspects. Factors in addition to technology which operate on the supply side to bring about disequilibrium include changes in factor prices, foreign competition, the natural increase of farm population and discovery and development of new supplies of natural resources.<sup>23</sup>

The factors generating disequilibrium from the demand side are basically those relating to increased real per capita income. Low income elasticity of demand for many agricultural

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<sup>23</sup>Marvin Wayne Trautwein. Differential rates of resource adjustment within Iowa agriculture, 1940 to 1954. Unpublished M. S. thesis. Ames, Iowa, Library, Iowa State University of Science and Technology. 1958. p. 4.

commodities causes the demand for these products to decrease as real incomes rise relative to the demand for products of many secondary and tertiary industries. Failure to have equitable income distribution violates the principle of distributive justice as a desired goal. Changes in population, consumer preferences and the introduction of substitute goods all act upon the demand for agricultural products.

The forces affecting supply of and demand for agricultural commodities exert their influence on both demand and supply. Complex interrelationships exist as the factors interact to determine effective supply and demand. An industry in perfect balance exhibits certain characteristics; characteristics which are applicable to any industry whether it is agriculture, transportation, manufacture or communications.

Kaldor suggest three conditions which dictate the degree of balance or imbalance which an industry is experiencing.<sup>24</sup> These conditions are: 1. that an industry operates at the least cost combination of resources. If this condition isn't being met, resources may be reallocated to increase both costs and outputs, increase output and leave costs constant or decrease costs and leave output constant. 2. that there is a balance between consumer demand for a particular product and the supply of that product. Failure to meet this condition means that the marginal rate of indifference substitution of

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<sup>24</sup>Kaldor. op. cit. pp. 10-16.

the consumer is not equal to the marginal rate of technical substitution of the consumer is not equal to the marginal rate of technical substitution for the producer. Proper rearrangement of intra-industry commodity production will insure fulfillment of this particular condition. 3. that the total product of an industry is geared to the aggregate demand for those products. If this condition is not satisfied, resources can and should be transferred from one industry to another until aggregate industry supply is equal to effective demand.

Current imbalance in agriculture appears to have two main facets. 1. The resource cost of producing total farm output is substantially higher than the feasible minimum. 2. The level of total output is too large in relation to the demand for farm products. Perhaps the first situation is more serious than the second.<sup>25</sup>

Investigation of time series data supplied by the United States Department of Agriculture shows that serious imbalances are presently evident in United States agriculture in general and in Iowa agriculture in particular. It is with specific reference to the imbalances in Iowa agriculture and the conditions leading to these imbalances with respect to the major resources that brings us to the problems of the Iowa farmer.

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<sup>25</sup>Don Kaldor. Adjusting resource organization and allocation. Iowa State University of Science and Technology. Center for Agricultural Adjustment. Problems and policies for American agriculture. pp. 322-338. Ames, Iowa, Iowa State University Press. 1959. p. 322.

Iowa has been and is experiencing serious imbalance with respect to all three of the essential balance conditions outlined earlier. While it is recognized that the problems of Iowa agriculture are not as acute as those faced by farmers in the cut-over areas of the northeast or certain sectors of the southeast, they are very real and trying.

Land, labor, capital and management resources are presently employed in a manner which should be altered significantly in order to arrive at the least cost combination of resources. (Balance condition #1.) Intra-industry production imbalances are present in Iowa agriculture to the extent that a farmer may possess better management ability in some enterprise not presently found on his farm. In certain instances crops or varieties of crops not specifically adapted to the particular area are grown. Iowa, along with other agricultural states, is subject to imbalances related to aggregative aspects of demand and supply. The labor situation on Iowa farms has changed a great deal. Utilization of capital in its many and varied forms has undergone tremendous change. The amount of land employed has been relatively stable but changes in land use have been extensive.

The problems of Iowa agriculture have been created by phenomena not greatly different than those creating the national agricultural problem. These causal phenomena will be the central theme of the analysis which follows.

## SOURCE OF DATA AND ESTIMATING TECHNIQUES

There are basically two different kinds of data for research purposes. First, secondary data collected by governmental agencies and individual research workers. Second, there is primary data collected directly by the researcher. Either primary or secondary data may be obtained with or without the use of a questionnaire or a sample of the population.

Secondary data is used in this study. Whenever possible, data has been taken directly from the U.S. Census of Agriculture. It is important to know the methods used to contend with the inconsistencies and inadequacies found in the data recorded in the Census of Agriculture. Therefore, a few statements are presented below to clarify the use made of the data and the adjustments deemed necessary.

In most instances, the period studied was from 1940 to 1959. However, 1959 data relating to such topics as the farm labor force and the value of durable capital inputs in agriculture was either not available or not sufficiently specific to be of any use in this study. Instead, data from 1960 was used in place of 1959 data in the analysis of the farm labor force and the input of durable capital items on Iowa farms.

## Data for Farms in General

The changes in the number of farms in Iowa were calculated from data taken directly from the Census of Agriculture. The

census definition of what constitutes a farm has changed twice since 1940. The most noticeable of these two definitional changes is the one which occurred between the 1954 and 1959 census enumerations. The exact provisions of the varied definitions of a farm are spelled out in the next section. It is sufficient to say here that the 1959 definition of a farm eliminated from the enumeration several businesses that had been classed as farms under previous definitions.

It was estimated that 1% to 2% of the change in the number of farms in Iowa can be attributed to the change in the census definition of a farm. This particular definitional change may be handled in either one of two ways.

1. Ignore the definitional influence in the graphical presentation, but make reference to the implications of the definitional change in the discussion so that the reader can make the necessary adjustments if he so desires.
2. Adjust all data upon which the analysis is based before proceeding with the analysis.

The author used the first approach rather than the second because the absolute effect of the change in the definition of a farm has been quite small. The reader should be aware of the influence of the changed definition of a farm when considering the patterns exhibited in Iowa with respect to the change in number of farms, average farm size and the number of farms in the various acreage classifications.

### Data Relating to Major Resource Inputs

The value per acre of farm land and buildings, as recorded in the Census of Agriculture, was taken as an indication of the value of the land input on Iowa farms. No corrections were made to account for inflation that may have occurred during the study period. This is not to say that such corrections or adjustments can not be made but rather that they were not necessary in this case. Adjustments for inflation could have been made, but the conclusions reached in this particular study would have been nearly the same. The data relating to the input of durable capital items on Iowa farms was interpreted in terms of constant 1947-49 dollars.

The United States Population Census provided the main source of data concerning the dynamics of the farm labor force in Iowa. All data pertaining to labor, except that which indicated the size of the hired labor force in Iowa agriculture in 1939-40, was taken from the Population Census. Data relating to the hired labor forces in 1939-40 was obtained from the 1940 Census of Agriculture.

As used in this study, the term "farm labor force" refers to males and females employed in agriculture. The terms agriculture and farming have been used as synonyms throughout. To indicate the size of the hired work force in agriculture, data representing the number of hired workers working 150 or more days per year was used. No consideration was given to labor employed in agriculture less than 150 days per year.



To analyse the changes which have been experienced in the last 20 or more years with respect to capital employed on Iowa farms, one basic assumption was necessary. It was assumed that the trend in the total amount of capital used on Iowa farms could be implied from the observed trend in the use of durable capital items during the period from 1940 to 1960. Two references supplied the necessary information concerning the input of durable capital items on Iowa farms.

The technique for estimating the value of durable capital inputs on Iowa farms was taken from a study by Trautwein in 1958.<sup>1</sup> Trautwein's estimate of the value of durable capital on Iowa farms was used as the basis for comparison of durable capital inputs.

Only minor alterations were made in Trautwein's procedure to compute the value of durable capital inputs used on Iowa farms in 1960. First, nearly all the data relating to durable capital items was obtained from the Annual Farm Census data compiled by the Iowa Department of Agriculture rather than the United States Census of Agriculture. The data from the Iowa publication was, in general, much more easily obtained and utilized than was the data used by Trautwein.

Second, the most obvious deviation in the sources of data used in this thesis from the sources used by Trautwein is in

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<sup>1</sup>Marvin Wayne Trautwein. Differential rates of resource adjustments within Iowa agriculture, 1940 to 1954. Unpublished M. S. thesis. Ames, Iowa, Library, Iowa State University of Science and Technology. 1958. pp. 80-83.

the estimation of the number of breeding ewes on Iowa farms. Trautwein made use of the multiple regression technique to estimate the number of breeding ewes on Iowa farms.<sup>2</sup> This author simply collected data indicating the number of breeding ewes compiled by the census bureau of the United States Department of Commerce. The 1947-49 prices used by Trautwein were used in the current study.\* To provide any comparison between the dollar value of current estimates of the durable capital items employed on Iowa farms and the estimates in the Trautwein study, it was necessary to use the values determined by Trautwein. It is realized, of course, that the value of durable capital items presently employed on Iowa farms expressed in terms of constant 1947-49 dollars does not illuminate the situation which exists presently in terms of current dollars. An Iowa farmer pays for durable capital items in current dollars not 1947-49 dollars.

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<sup>2</sup> Ibid. p. 82.

\*Trautwein established values for durable capital items by using 1947-49 prices and estimated values of various durable capital items as found in Agricultural Statistics. The values assigned to the selected durable capital items were, a) tractors \$2100, b) trucks \$1847, c) horses \$46.67 per head, d) mules \$61.83, e) combines \$1140, f) corn pickers \$1210, g) dairy or milk cows \$184, h) beef cows \$179.08, i) sows and gilts \$56.06, j) ewes \$11.70.

## GENERAL STUDY AREAS

In the early stages of the nation's development, immigrants from foreign countries were encouraged to come to the United States in the anticipation that their intellect, skill and efforts would aid in developing a strong nation. In those early times, one of the major challenges facing the United States was to provide an adequate and inexpensive supply of basic food commodities.

The agricultural industry was called upon to develop ways to increase production. If rapid increases in aggregate output of agriculture did not occur, the increasing demand for food resulting from the rapid increases in population, both natural and because of immigration, the nation would fail to make progress and become stagnant. The present diet of the American people indicates that agriculture responded marvelously.

At first a progressive agricultural sector complemented industrial development. As we have seen earlier, agriculture supplied labor and an abundant supply of food to the industrial sector. As people received higher incomes, in the very early stages of the industrial expansion, they spent increasing amounts of money to satisfy their demand for food. This era was short lived and soon gave rise to the situation described by Engle's law.<sup>1</sup> As consumer incomes rose above the amount

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<sup>1</sup>Richard H. Leftwich. The price system and resource allocation. New York, New York, Holt, Rinehart and Winston. 1961. p. 86.

necessary to provide a subsistence level of living, the absolute expenditure on food increased but the proportion of income spent on food decreased.

As effective consumer demand for food products decreased relative to the supply of food products, product prices were forced downward. Lower commodity prices resulted, in many cases, in lower incomes than had previously been experienced by farmers. Incomes in agriculture are said to be presently about half as high as incomes in non-agricultural industry.

I do not mean to imply that the problems of agriculture are accurately described as either price or income problems. As has been shown earlier, price, and even income considerations for that matter, are only some of the components of the problem.

Agriculture in the United States, as a result of the development of a vast industrial complex, has been subjected to serious social and economic problems. Iowa, as one of the leading states in the nation with respect to total agricultural output, has felt the "growing pains" resulting from the process of economic progress.

The value productivity of labor employed in Iowa agriculture is much lower than that of labor employed in non-agricultural industry. However, it may well be that labor in Iowa agriculture is more productive than labor employed in agriculture in other states. Further consideration of this point is beyond the scope of this study. Technical innovations have changed the relative marginal productivity of resources

in agriculture. The change in relative resource productivity has necessitated alterations in the pattern of resource allocation within the industry of agriculture and between it and other industries.

In attempting to keep abreast of the necessary changes in the factor-product, factor-factor and product-product relationships, Iowa farmers have made many drastic changes in the basic organization of their farms. No longer are crops planted, cultivated and harvested by hand or with the aid of simple machines and animal power. The Iowa farmer does not butcher his own animals, churn his own butter or even shell his own corn. Livestock production has undergone drastic changes as well. It is with changes similar to these but perhaps more general that we are concerned.

To get an accurate measure of the changes which have taken place in Iowa agriculture it would be necessary to obtain accurate per unit productivity coefficients for all resources employed in all alternative enterprises. Precise and accurate productivity coefficients of this nature are not readily available. This is not to say that they are impossible to obtain but rather that they would be very difficult and expensive to obtain. The inadequacy of the records on many farms in Iowa implies the difficulty that would be encountered in trying to obtain useful productivity coefficients.

Since productivity coefficients weren't available, it was necessary to turn to other indicators which would reflect the

magnitude of the changes which have taken place in Iowa farming. The indicators selected were the absolute and percentage changes during the last 20 years, 1940 to 1959. Interesting information is revealed when we consider various aspects of the following:

1. changes in the number of farms.
2. changes in the average farm size.
3. changes in the distribution of farms by size as indicated by changes in number of farms in various acreage classifications.
4. changes in the tenure structure.
5. changes in the value of land and buildings.
6. changes in the farm labor force.
7. changes in capital inputs.

These seven areas are not the only considerations which would yield information reflecting the changes in the structure and organization of Iowa farms. They are, however, the most readily available. A quick look at the areas listed above shows that actually two categories are being studied. First, the results of phenomena relating to the industry of agriculture as indicated by the first four areas. Secondly, the causal factors as illustrated by the last three areas.

#### Dynamics of Iowa Agriculture, 1940 to 1959-60

##### Number of farms

The number of farms in the state of Iowa declined by 18.1% from 1940 to 1959. In 1940 there were 213,318 farms in Iowa;

in 1959 there were only 174,707. This is a decrease of 38,611 farms for the state as a whole. About 1/2 of the 18.1% decrease in number of farms occurred since 1954. In 1954 there were 192,933 farms in Iowa. In the last five years of the period from 1954 to 1959, there was a decline of 18,226 farms.

Before proceeding further into the considerations relating to numbers of farms, an explanation or definition of what constitutes a farm is necessary. Since the basic data for much of this analysis was taken from the United States Census of Agriculture, an explanation of the census definition of a farm is needed.

"Places of less than 10 acres in 1959 were counted as farms if the estimated sales of agricultural products for the year amounted to at least \$250. Places of 10 or more acres in 1959 were counted as farms if the estimated sales of agricultural products for the year amounted to at least \$50. Places having less than the \$50 or \$250 minimum estimated sales in 1959 were also counted as farms if they could normally be expected to produce agricultural products in sufficient quantity to meet the requirements of the definition."<sup>2</sup>

The fact that estimates of the value of products sold were allowed indicates subjectivity in the actual accounting.

"In 1950 agricultural operations were defined to include every place of 3 or more acres whether or not the operator

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<sup>2</sup>U.S. Census Bureau. 1959 Census of Agriculture. Vol. 1, Part 16. 1961. p. XIV.

considered it a farm, and every place having 'specialized operations' regardless of the operation."<sup>3</sup>

The 1950 definition provided for the inclusion of a large number of places not included in the 1959 definition.

"In the censuses from 1925 to 1945 the census takers were given a definition of a 'farm' and were instructed to obtain reports only for those places which met the criteria. According to this definition, farms included all places of 3 or more acres, regardless of the quantity or value of agricultural production, and places of less than 3 acres if the value of agricultural products, whether for home use or for sale, amounted to \$250 or more."<sup>4</sup>

The use of these various definitions during the period from 1940 to 1959-60 has had some effect on the number of farms reported in the particular census years. For example, 1% to 2% of the drop in the number of farms from 1954 to 1959 was purely a result of definitional change. Since the influence of definitional change has been so small especially when viewed over the 20 year period being studied, the decline in number of farms due to definitional change is ignored. Simply subtracting 1%-2% from the percentage changes indicated in figure 1 would show the effects of definitional change.

Figure 1 shows the percentage increase or decrease in the

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<sup>3</sup>Ibid. p. XV.

<sup>4</sup>Ibid. p. XV.



Figure 1. Change in the total number of farms  
by county for Iowa, 1940 to 1959.

(Numbers top to bottom in each county:  
number of farms in 1940, number of farms  
in 1959, difference between 1940 and 1959,  
and percentage change in the number of  
farms, 1940 to 1959.)

LYON 1870 1867 0	OSCEOLA 1306 1233 -73	DICKINSON 1259 1075 -181	EMMET 1315 1100 -215	KOSSUTH 3106 2906 -200	WINNEBAGO 1646 1463 -183	WORTH 1533 1354 -179	MITCHELL 1738 1515 -223	HOWARD 1749 1576 -173	WINNEBIEK 2887 2442 -445	ALLAMAKEE 2088 1717 -371		
SIoux 3028 2725 -303 -10	O'BRIEN 1986 1796 -190 -10	CLAY 1840 1577 -263 -14	PALO ALTO 1864 1643 -221 -12	-200 -6	HANCOCK 1998 1833 -165 -8	CERRO GORDO 1996 1732 -264 -13	FLOYD 1897 1619 -278 -15	CHICKASAW 2053 1766 -287 -14	FAYETTE 3109 2615 -94 -16	CLAYTON 2970 2483 -487 -16		
PLYMOUTH 2842 2595 -247 -9	CHEROKEE 1824 1603 -221 -12	BUEHA VISTA 2110 1836 -274 -13	POCAHONTAS 2039 1767 -272 -13	HUMBOLDT 1425 1291 -9 -134	WRIGHT 1987 1708 -279 -14	FRANKLIN 2158 1885 -273 -13	BUTLER 2361 2064 -297 -13	BREMER 2060 1834 -11 -226	BLACK HAWK 2494 1966 -528 -21	DUCHANAN 2367 2092 -275 -12	DELAWARE 2248 2036 -212 -9	DUBUQUE 2303 1896 -407 -18
WOODBURY 3192 2407 -785 -25	IDA 1389 1270 -119 -9	SAC 2058 1746 -312 -15	CALHOUN 2097 1738 -359 -17	WEBSTER 2678 2149 -529 -20	HAMILTON 2161 1902 -259 -12	HARDIN 2062 1941 -121 -6	GRUNDY 1788 1683 -105 -6	TAMA 2724 2335 -389 -14	BENTON 2490 2201 -289 -12	LINN 3728 2683 -1045 -28	JONES 2139 1865 -274 -15	JACKSON 2227 -356 1871 -16
MONONA 2091 1625 -466 -22	CRAWFORD 2507 2121 -386 -15	CARROLL 2119 1896 -223 -10	GREENE 2159 1682 -477 -22	BOONE 2504 1948 -556 -23	STORY 2292 1845 -447 -20	MARSHALL 2302 1974 -428 -14	POPEHSHIEK 2161 1825 -336 -16	IOVA 2155 1744 -411 -18	JOHNSON 2573 2071 -502 -20	CLINTON 2649 -314 2385 -12	SCOTT 2287 1778 -509 -22	
HARRISON 2637 1891 -746 -26	SHELBY 2148 1832 -316 -15	AUDUBON 1820 1505 -315 -17	BUTTRIE 2394 1800 -594 -25	DALLAS 2448 1786 -662 -27	POLK 3139 1926 -1213 -39	JASPER 2988 2364 -624 -21	POPEHSHIEK 2161 1825 -336 -16	IOVA 2155 1744 -411 -18	JOHNSON 2573 2071 -502 -20	MUSCATINE 1744 -11 -22	STATE 213318 174707 -38611 -18	
POTTAWATTAMIE 3793 2820 -973 -26	CASS 2205 1695 -510 -22	ADAIR 2098 1710 -388 -18	MADISON 2088 1655 -433 -21	WARREN 2487 1870 -617 -25	MARION 2459 1881 -578 -24	MAHASKA 2728 2052 -676 -25	KEOKUK 2532 1944 -588 -23	WASHINGTON 2266 1854 -412 -18	LOUISA 1306 1097 -209 -16	HENRY 1782 1395 -335 -18	DES MOINES 1866 1531 -335 -415	
MILLS 1500 1114 -26 -86	MONTGOMERY 1833 1269 -22 -364	ADAMS 1582 1233 -22 -349	UNION 1603 1176 -27 -427	CLARKE 1450 1124 -22 -326	LUCAS 1665 1185 -29 -480	MONROE 1643 1174 -28 -469	WAPELLO 2008 1494 -26 -514	JEFFERSON 1782 1395 -22 -387	HENRY 1782 1395 -22 -387	DAVIS 1756 1385 -371 -24	LEE 2106 1586 -520 -25	
FREMONT 1742 1198 -544 -31	PAGE 2100 1642 -458 -22	TAYLOR 2208 1605 -603 -28	RINGOLD 1863 1311 -542 -29	DECATUR 1919 1268 -651 -34	WAYNE 1740 1426 -314 -18	APPAROOSE 2092 1490 -602 -25	DAVIS 1852 1386 -466 -25	VAN BUREN 1756 1385 -371 -21	LEE 2106 1586 -520 -25			

number of farms by county during the period 1940 to 1959. There is much dispersion among the various counties with respect to the changes in the number of farms located in each. It is interesting to note that every county in the state experienced a decrease in the number of farms during the period studied.

Polk county exhibited a 38.6% decrease in the number of farms which was the largest decline experienced by any county. In 1940 there were 3,139 farms in Polk county; in 1959 only 1,926 remained. Decatur county in south central Iowa experienced a 33.9% decline in farm numbers. In 1940, 1,919 farms were being operated in Decatur county, but in 1959 the number had fallen to 1,268.

At the opposite extreme, we find Lyon and Osceola counties with 0.2% and 5.6% declines respectively. There were only 3 fewer farms in Lyon county in 1959 than in 1940. In 1940 there were 1,306 farms in Osceola county and in 1959 there were 1,233.

At first it may seem that Polk county experienced much greater change in number of farms than Decatur county because of the large absolute decrease evidenced above. This is not necessarily the case for it was just as difficult for a farmer to quit farming in Decatur as for a farmer to quit farming in Polk county. It is percentage changes not absolute changes that illustrate the changes in number of farms.

The decrease in the number of farms has not been of a

gradual nature. While most counties had fewer farms reported in each agricultural census since 1940, it is interesting to point out that much of the decrease occurred after 1950. For example, 800 of the 1213 farms which discontinued operation in Polk county between 1940 and 1959 actually ceased operations after 1950. Decatur county followed the same general pattern. Lyon county, however, was one of the few counties in which the number of farms increased in the period from 1940 to 1950. It is difficult to explain the trend observed in Lyon county. The explanation for the trend might lie in the quality of soil and climatic factors or maybe in the social customs of the people living in Lyon county.

Heady has found that although the trend for the state since 1920 has been toward larger farms and fewer of them, 34 counties showed increases in the number of farms between 1920 and 1940. This was especially true in northern Iowa.<sup>5</sup> Census data indicate that this situation continued in a few northern Iowa counties until as late as 1950.

Figure 1, while it shows the change in the number of farms for each county in Iowa, does not give much indication of the relative changes in number of farms between regions or areas of the state. General knowledge of the difference in climatic and soil conditions in various parts of the state implies that

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<sup>5</sup>Earl O. Heady. Pattern of farm size adjustment in Iowa. Iowa Agr. Exp. Sta. Res. Bul. 350: 288-311. 1947. p. 297.

the change in the number of farms in one area of the state may have been different than in another.

Figure 2 shows the average percentage change in the number of farms for the state by region. Northwestern Iowa has experienced the smallest percentage change in the number of farms. The average percentage decline in number of farms in northwest Iowa was about 11%. This 11% drop is relatively small when compared to the 26%, 24% and 22% declines in the south central, southwestern and southeastern regions of the state. Table 1 shows the figures from which these percentages were derived.

Table 1. Changes in number of farms by area for state of Iowa, 1940-1959.

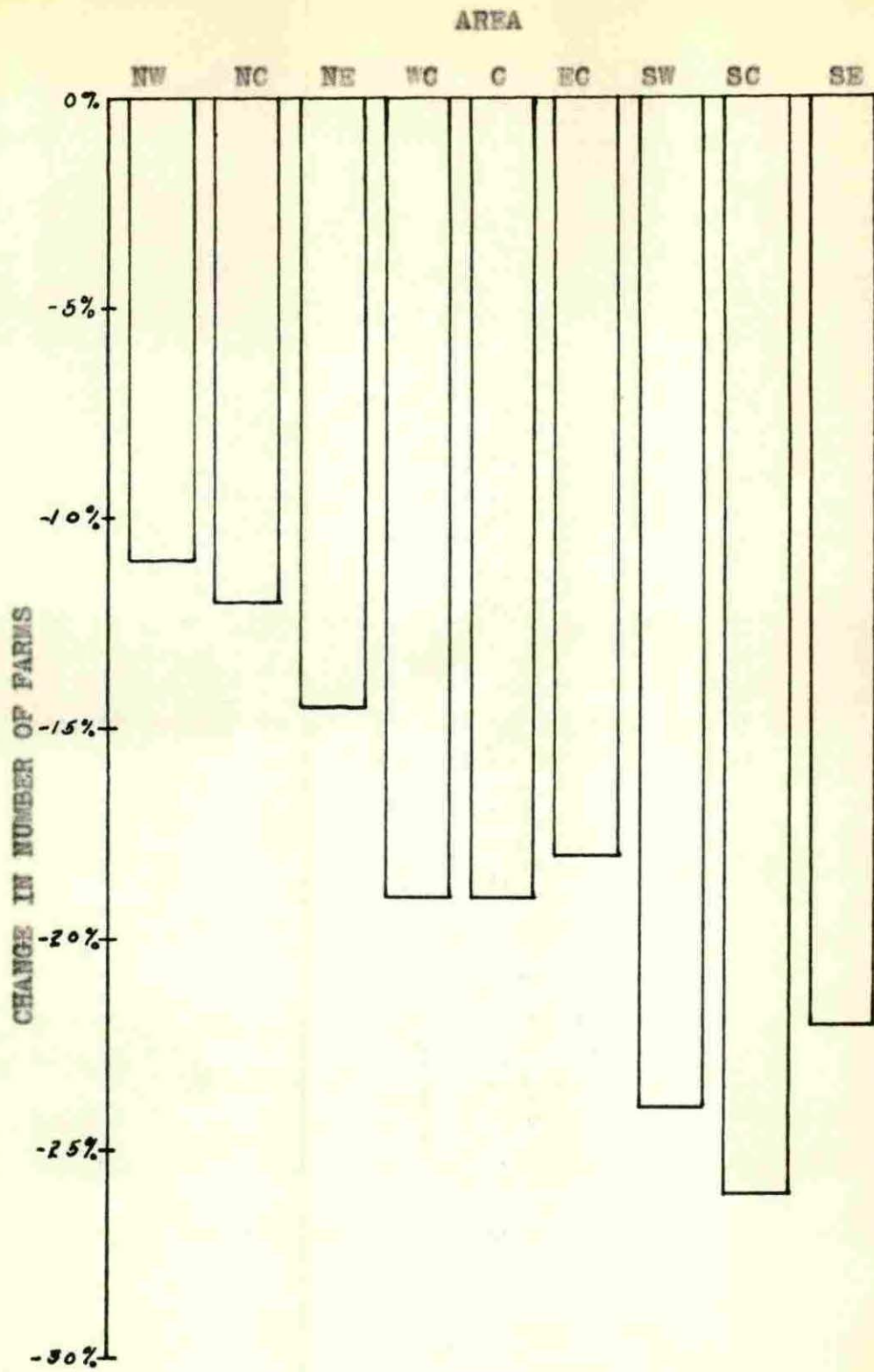
Areas of Iowa	Number of farms in 1940 <sup>a</sup>	Number of farms in 1959 <sup>b</sup>	Difference
Northwest	23,280	20,817	2,463
North Central	21,848	18,970	2,878
Northeast	26,328	22,423	3,905
West Central	26,611	21,513	5,098
Central	29,247	23,678	5,569
East Central	24,219	20,076	4,144
Southwest	18,861	14,286	4,575
South Central	20,999	15,560	5,439
Southeast	21,928	17,035	4,893

<sup>a</sup>Taken from the 1940 U.S. Census of Agriculture for Iowa

<sup>b</sup>Taken from the 1959 U.S. Census of Agriculture for Iowa

It is difficult, based on information presented to this point, to suggest why southern Iowa has experienced so much

Figure 2. Percentage change in the number of farms by area  
for Iowa, 1940 to 1959.



change in the number of farms. It might be thought that the reduction in Iowa could be explained by a series of poor weather periods. However, studies by Thompson would not support this idea.<sup>6</sup> Another possible reason for the decrease is that before 1940 large numbers of subsistence farmers were found in southern Iowa. With the pressures placed on agriculture as a result of general economic progress, many of the marginal farmers were forced to leave the farm. Changes in the number of farms implies labor mobility. As the number of farms decreases, the labor freed from agriculture must seek new employment. As the analysis progresses, the reorganization of resources which have occurred in Iowa agriculture will become evident.

#### Farms by acre classification

We have looked briefly at changes in the total number of farms for the state, county and area units. Unanticipated changes in the number of farms falling into various acreage classifications are depicted in figure 3. As was pointed out earlier, the trend is toward larger farms. This trend is not universal for all counties of the state. Figure 3 shows that eight counties in Iowa actually had increases in the number of farms 10 acres or less. Hancock county exhibited a 91% increase in the number of farms under 10 acres. In 1940

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<sup>6</sup>Louis M. Thompson. How weather has affected our feed grain surplus. Better Farming Methods 34, No. 9: 14-15, 28. September 1962.



there were only 43 farms less than 10 acres, but in 1959 there were 82 farms in this classification. Other counties showing increases in the very small farms were Hardin, 12% representing an increase of 8; Muscatine, 25.9% representing an increase of 15; Humbolt, 13.3% representing an increase of 4; Clay, 6.1% and Wayne, 1.8%. Jones and Osceola counties showed no change in the number of farms under 10 acres.

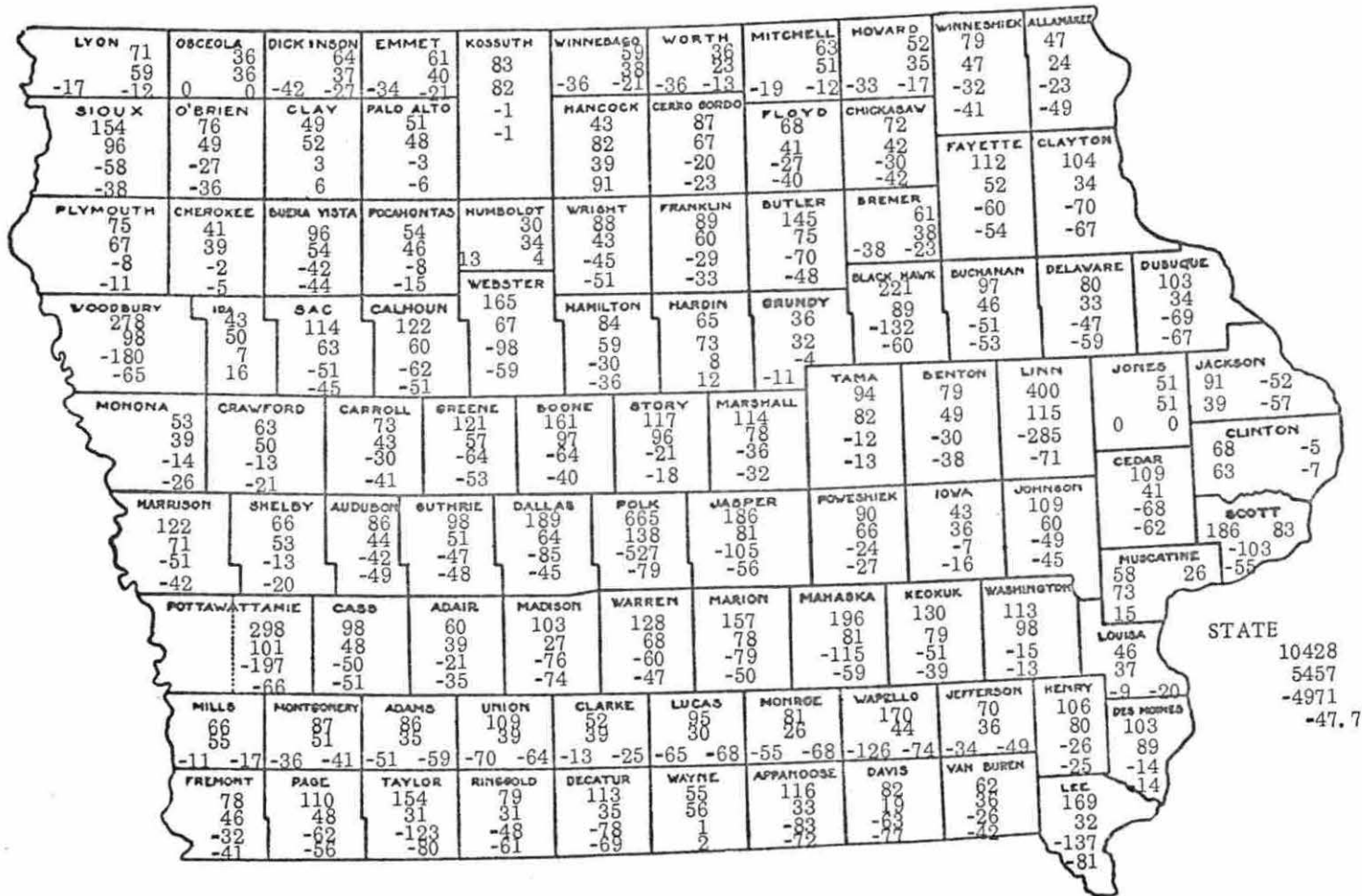
These increases exist even in view of the fact that the changed census definition of a farm eliminated many of the farms in less than 10 acre classification. If the 1950 definition had been used in the 1959 census, 646 more farms of less than 10 acres would have been counted.

In attempting to explain why these counties showed increases in the number of farms under 10 acres, several suggestions are made. First, city people may be buying small acreages in order to enjoy the aesthetic values of farm life. Many of these non-farm rural residents produce enough agricultural output to qualify as farms. Second, farm people realizing that greater earning opportunities exist in non-farm employment have taken jobs in town but continued to live on farms and raise livestock in their spare time. Third, as farmers retire they don't move to the nearest town. Instead, they remain on the farm and rent out most of the land. Retired farmers may raise a small amount of livestock or a few acres of crops just to keep themselves active.

Except for the eight counties mentioned above, all

Figure 3. Change in the number of farms under 10 acres by county for Iowa, 1940 to 1959

(Numbers top to bottom in each county: number of farms under 10 acres in 1940, number of farms under 10 acres in 1959, difference between 1940 and 1959, and percentage change in the number of farms under 10 acres, 1940 to 1959.)



45

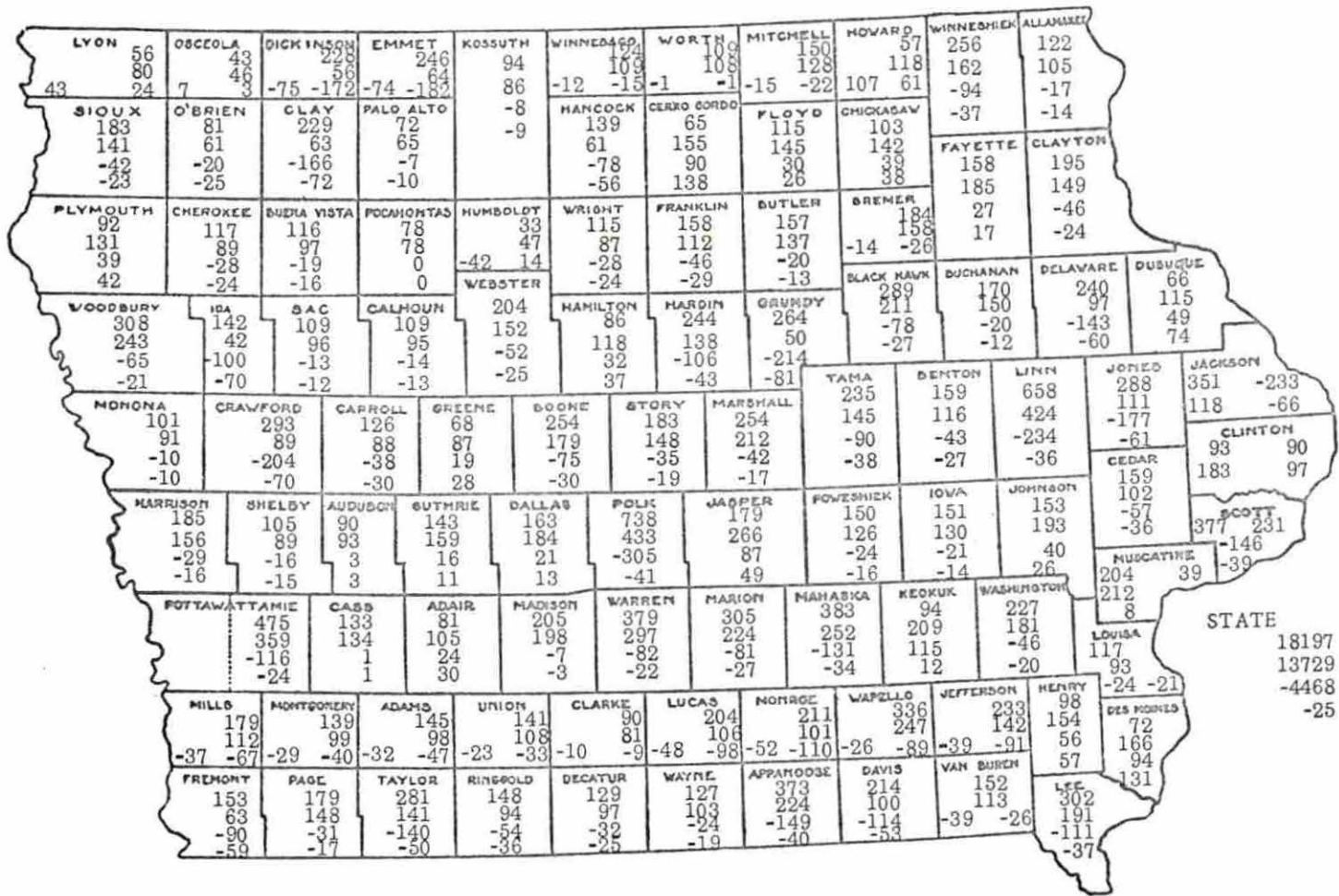
counties in Iowa have fewer farms in the less than 10 acre classification in 1959 than in 1940. Taylor county in southwestern Iowa showed an 80% decrease while Lee county in the southeastern corner of the state exhibited an 81% decrease in the number of farms in this particular classification. In general, with but few exceptions, southern Iowa counties have experienced the largest decrease in the number of extremely small farms. In 1940, southern Iowa had relatively more small farms than northern Iowa. The value productivity of resources on these small farms was driven below the subsistence level by the falling prices and resulting low incomes of more recent years. As a result, small farmers were forced to leave agriculture in order to earn a satisfactory living.

Generally speaking, Iowa farms have become larger and there are fewer of them. However, Iowa farms have not grown to a size which might suggest corporation farming. Corporation farms are most often considered as being in excess of 1000 acres. Let us look at the above from three points of view.

All counties in Iowa except Plymouth, Pocahontas, Humbolt, Floyd and Lyon counties showed a decrease in the number of farms less than 100 acres (see figures 4, 5, and 6). Those five counties, located for the most part in northwestern Iowa, experienced increases in the number of farms under 100 acres. Few, if any, large industrial areas which are causing farmers to reduce their acres and take jobs in a factory exist in that section of the state. More probably, farmers are

Figure 4. Change in the number of farms 10 to 49 acres by county for Iowa, 1940 to 1959.

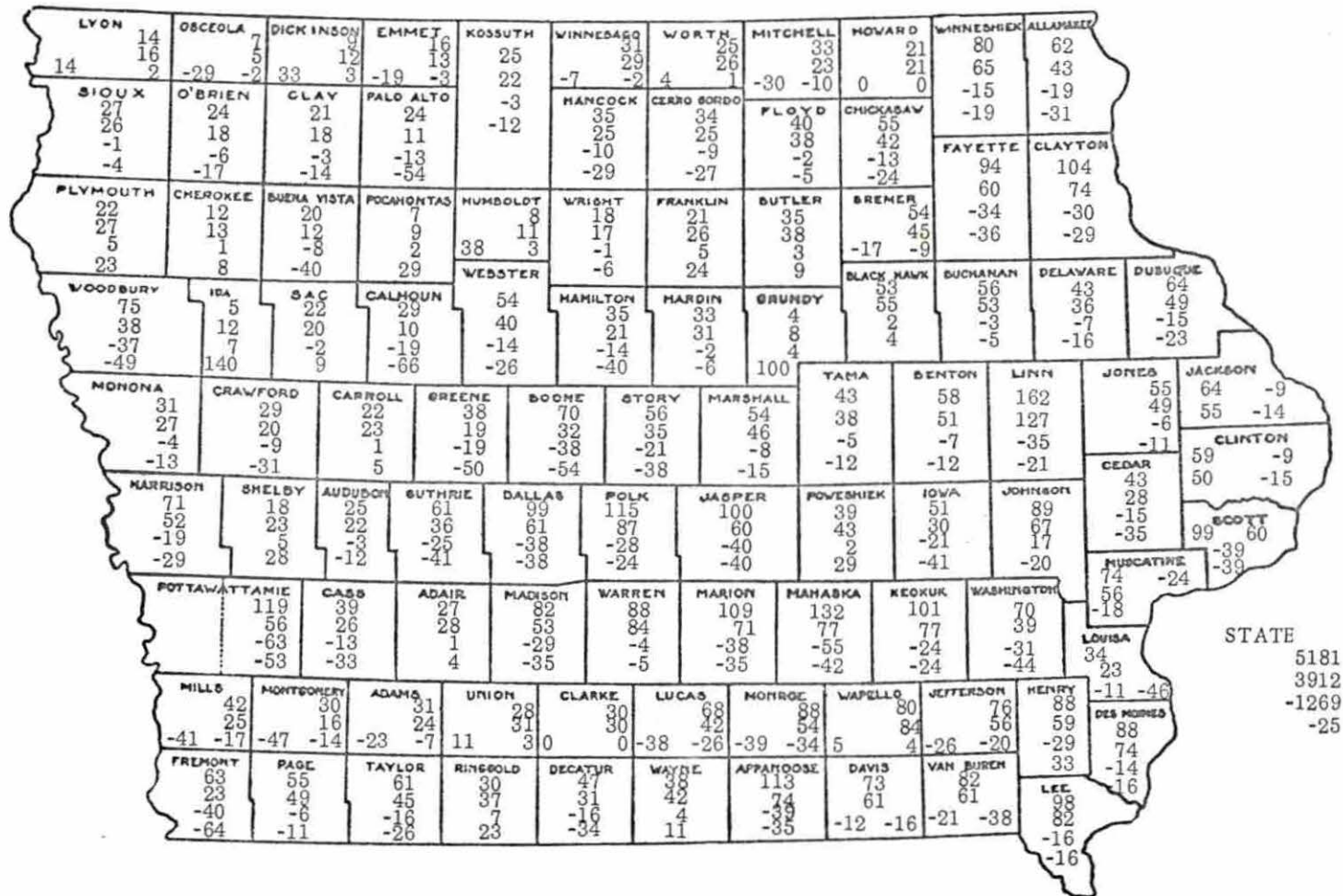
(Numbers top to bottom in each county: number of farms 10 to 49 acres in 1940, number of farms 10 to 49 acres in 1959, difference between 1940 and 1959, and percentage change in number of farms 10 to 49 acres, 1940 to 1959.)



STATE  
18197  
13729  
-4468  
-25

Figure 5. Change in number of farms 50 to 69 acres  
by county for Iowa, 1940 to 1959

(Numbers top to bottom in each county:  
number of farms 50 to 69 acres in 1940,  
number of farms 50 to 69 acres in 1959,  
difference between 1940 and 1959, and  
percentage change in number of farms 50  
to 69 acres, 1940 to 1959.)

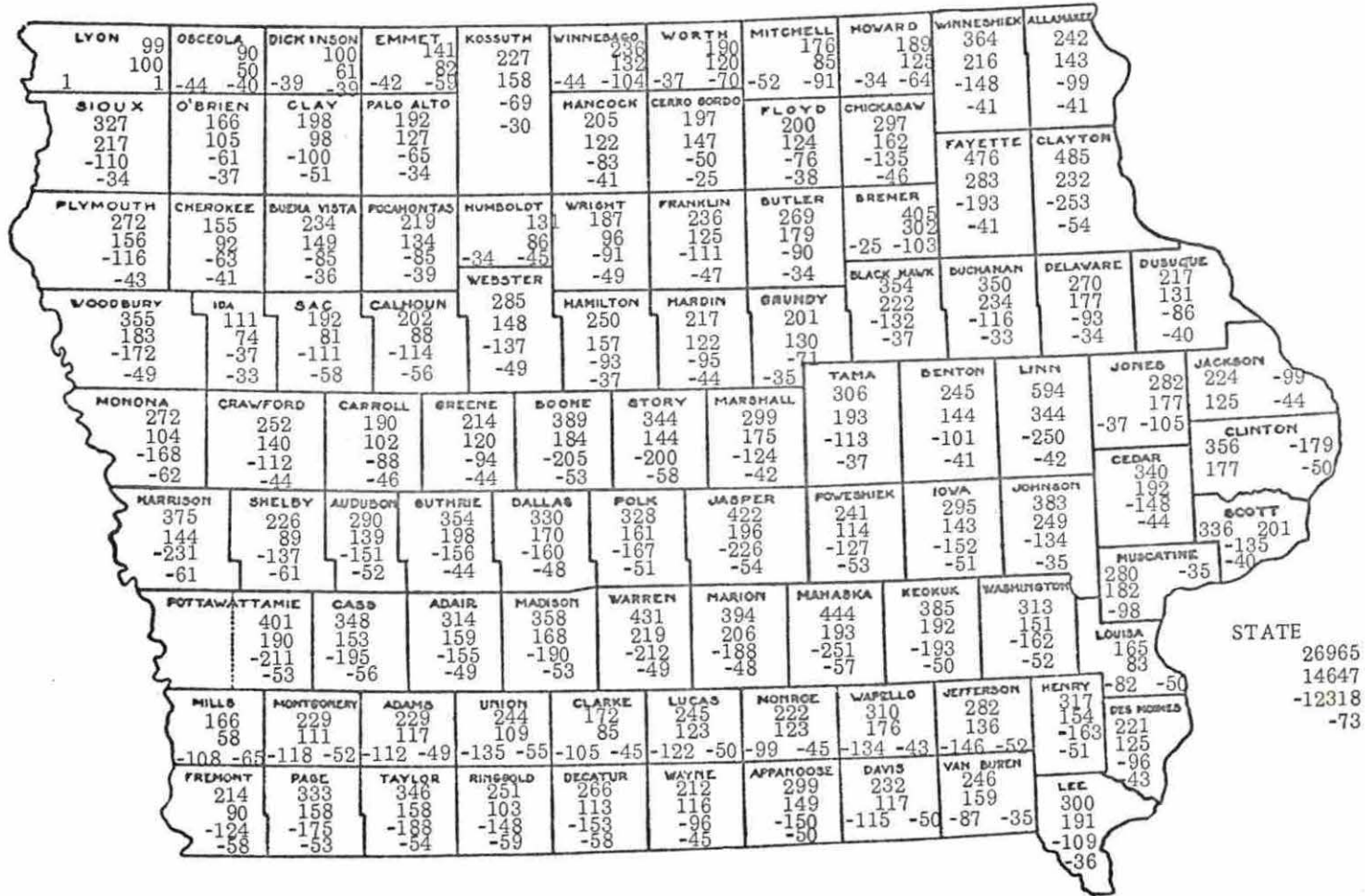


STATE  
5181  
3912  
-1269  
-25



Figure 6. Change in the number of farms 70 - 99 acres by county for Iowa, 1940 to 1959

(Numbers top to bottom in each county: number of farms 70 - 99 acres in 1940, number of farms 70 - 99 acres in 1959, difference between 1940 and 1959 and percentage change in number of farms 70 - 99 acres, 1940 to 1959.)



taking jobs as carpenters, service station attendants, janitors in schools or feed and insurance salesmen while cutting back on the number of acres farmed."

Figures 7, 8, and 9 indicate that all counties in Iowa experienced a general decrease in the number of farms from 100 to 220 acres. Again, southern Iowa counties showed relatively larger percentage decreases than northern Iowa counties. A farm of 220 acres, while it is above the state average of 193, is not a very large farm. As indicated by the decrease in the number of farms of 220 acres or less, a farmer has difficulty in earning an adequate income on a farm of less than 220 acres.

One of two situations has confronted farmers on the smaller sized farms in Iowa during the last 20 years. 1. Due to limitations on the amount of capital which was available, farmers could not expand their operations enough to continue farming. 2. Because of careful planning, they had adequate equity and/or availability of capital to acquire additional tracts of land. These two situations interacted to facilitate expansion of the land base per farm.

As indicated in figures 10, 11, and 12, the number of

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<sup>2</sup>The case of a particular farmer in northwest Iowa with whom I am well acquainted serves as an illustration. For 18 years this man farmed 320 acres as a tenant. In 1957 he purchased 120 acres of the land he had been farming and continued to rent only 80 acres. He now farms a total of 200 acres. Rather than keeping a constant income by maintaining his acreage at 320 acres he began to sell insurance. It is my contention that many farmers are, in fact, doing this same thing.

Figure 7. Change in the number of farms 100 to 139 acres by county for Iowa, 1940 to 1959

(Numbers top to bottom in each county: number of farms 100 to 139 acres in 1940, number of farms 100 to 139 acres in 1959, difference from 1940 to 1959, and percentage change in the number of farms 100 to 139 acres, 1940 to 1959.)

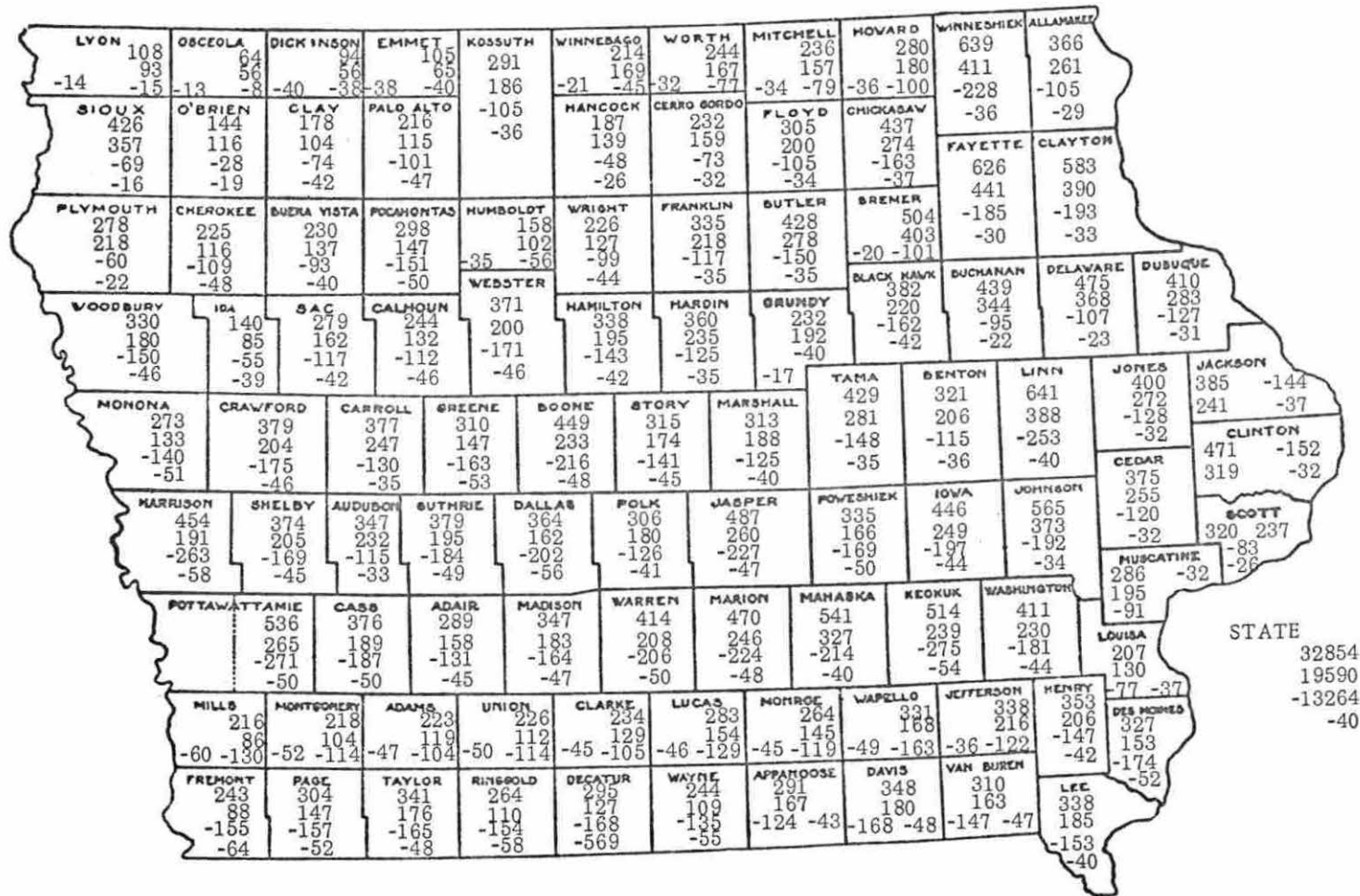


Figure 8. Change in the number of farms 140 to 179 acres by county for Iowa, 1940 to 1959

(Numbers top to bottom in each county:  
number of farms 140 to 179 acres in 1940,  
number of farms 140 to 179 acres in 1959,  
difference between 1940 and 1959, and  
percentage change in the number of farms  
140 to 179 acres, 1940 to 1959.)

<b>LYON</b> 773 -31	<b>OSCEOLA</b> 577 -21	<b>DICKINSON</b> 424 -33	<b>EMMET</b> 425 -37	<b>KOSSUTH</b> 1107 922	<b>WINNEBAGO</b> 543 -18	<b>WORTH</b> 404 -22	<b>MITCHELL</b> 482 -23	<b>HOWARD</b> 508 -19	<b>WINNEBIEK</b> 646 -71	<b>ALLAMAKEE</b> 410 -126		
<b>SIOUX</b> 978 865 -113 -12	<b>O'BRIEN</b> 801 632 -169 -43	<b>CLAY</b> 560 419 -141 -25	<b>PALO ALTO</b> 565 394 -171 -30	<b>HANCOCK</b> 746 609 -137 -18	<b>Cerro Gordo</b> 564 363 -201 -36	<b>FLOYD</b> 491 334 -157 -32	<b>CHICKASAW</b> 496 372 -124 -25	<b>FAYETTE</b> 731 600 -131 -18	<b>CLAYTON</b> 468 489 21 5			
<b>PLYMOUTH</b> 923 713 -210 -23	<b>CHEROKEE</b> 530 358 172 -33	<b>SUDA VISTA</b> 692 536 -156 -23	<b>POCAHONTAS</b> 677 489 -188 -28	<b>HUMBOLDT</b> 440 318 -28 -122	<b>WRIGHT</b> 599 434 -165 -29	<b>FRANKLIN</b> 656 498 -158 -24	<b>BUTLER</b> 626 527 -99 -16	<b>BREMER</b> 465 407 -13 -58	<b>BLACK HAWK</b> 567 431 -136 -24	<b>BUCHANAN</b> 585 509 -76 -13	<b>DELAWARE</b> 541 546 5 1	<b>DUBUQUE</b> 464 440 -24 -5
<b>WOODBURY</b> 784 489 -295 -38	<b>IDA</b> 460 347 -113 -25	<b>SAC</b> 582 440 -142 -24	<b>CALHOUN</b> 627 432 -195 -31	<b>WEBSTER</b> 703 453 -250 -36	<b>HAMILTON</b> 570 470 -100 -18	<b>HARDIN</b> 558 500 -58 -10	<b>BRUNDY</b> 602 537 -65 -11	<b>TAMA</b> 705 559 -146 -21	<b>BENTON</b> 657 536 -121 -18	<b>LINN</b> 578 447 -131 -23	<b>JONES</b> 464 360 -104 -22	<b>JACKSON</b> 453 351 -23
<b>MONONA</b> 505 271 -234 -46	<b>CRAWFORD</b> 749 526 -223 -30	<b>CARROLL</b> 601 546 -55 -9	<b>GREENE</b> 560 351 -209 -37	<b>BOONE</b> 566 396 -170 -30	<b>STORY</b> 580 378 -202 -35	<b>MARSHALL</b> 545 444 -101 -19	<b>TAMA</b> 705 559 -146 -21	<b>BENTON</b> 657 536 -121 -18	<b>LINN</b> 578 447 -131 -23	<b>JONES</b> 464 360 -104 -22	<b>JACKSON</b> 453 351 -23	<b>CLINTON</b> 627 533 -94 -15
<b>HARRISON</b> 513 282 -231 -45	<b>SHELBY</b> 554 429 -125 -23	<b>AUDUBON</b> 425 329 -96 -23	<b>SUTHRIE</b> 553 355 -198 -36	<b>DALLAS</b> 476 304 -172 -36	<b>FOLK</b> 385 247 -138 -36	<b>JASPER</b> 590 464 -126 -21	<b>POWESHIEK</b> 547 377 -170 -31	<b>IOWA</b> 522 359 -163 -31	<b>JOHNSON</b> 510 381 -129 -25	<b>CEGAR</b> 529 475 -54 -10	<b>SCOTT</b> 545 441 -104 -19	
<b>POTTAWATTAMIE</b> 751 455 -296 -39	<b>CASS</b> 543 308 -235 -43	<b>ADAIR</b> 618 351 -267 -43	<b>MADISON</b> 365 219 -146 -40	<b>WARREN</b> 389 207 -182 -47	<b>MARION</b> 371 259 -112 -30	<b>MAHASKA</b> 414 317 -97 -23	<b>KEOKUK</b> 428 292 -136 -32	<b>WASHINGTON</b> 443 320 -123 -28	<b>LOUISA</b> 235 162 -73 -31	<b>HENRY</b> 349 261 -88 -25	<b>DES MOINES</b> 286 194 -92 -32	
<b>MILLS</b> 249 133 -47 -116	<b>MONTGOMERY</b> 395 226 -21 -169	<b>ADAMS</b> 355 199 -44 -156	<b>UNION</b> 332 190 -43 -142	<b>CLARKE</b> 290 151 -48 -139	<b>LUCAS</b> 244 143 -41 -101	<b>NORMAN</b> 235 156 -34 -75	<b>WAPELLO</b> 286 227 -21 -59	<b>JEFFERSON</b> 333 232 -30 -101	<b>HENRY</b> 349 261 -88 -25	<b>DES MOINES</b> 286 194 -92 -32		
<b>FREMONT</b> 343 147 -196 -57	<b>PAGE</b> 486 260 -226 -47	<b>TAYLOR</b> 472 250 -222 -47	<b>RINSBOLD</b> 356 166 -190 -53	<b>DECATUR</b> 323 171 -157 -48	<b>WAYNE</b> 366 213 -153 -42	<b>APPANOOSE</b> 283 162 -121 -46	<b>DAVIS</b> 320 202 -118 -37	<b>VAN BUREN</b> 321 180 -141 -44	<b>LEE</b> 329 239 -90 -27			

STATE  
50967  
37404  
-13563  
-27

Figure 9. Change in the number of farms 180 to 219 acres by county for Iowa, 1940 to 1959.

(Numbers top to bottom in each county: number of farms 180 to 219 acres in 1940, number of farms 180 to 219 acres in 1959, difference from 1940 to 1959, and percentage change in the number of farms 180 to 219 acres, 1940 to 1959.)



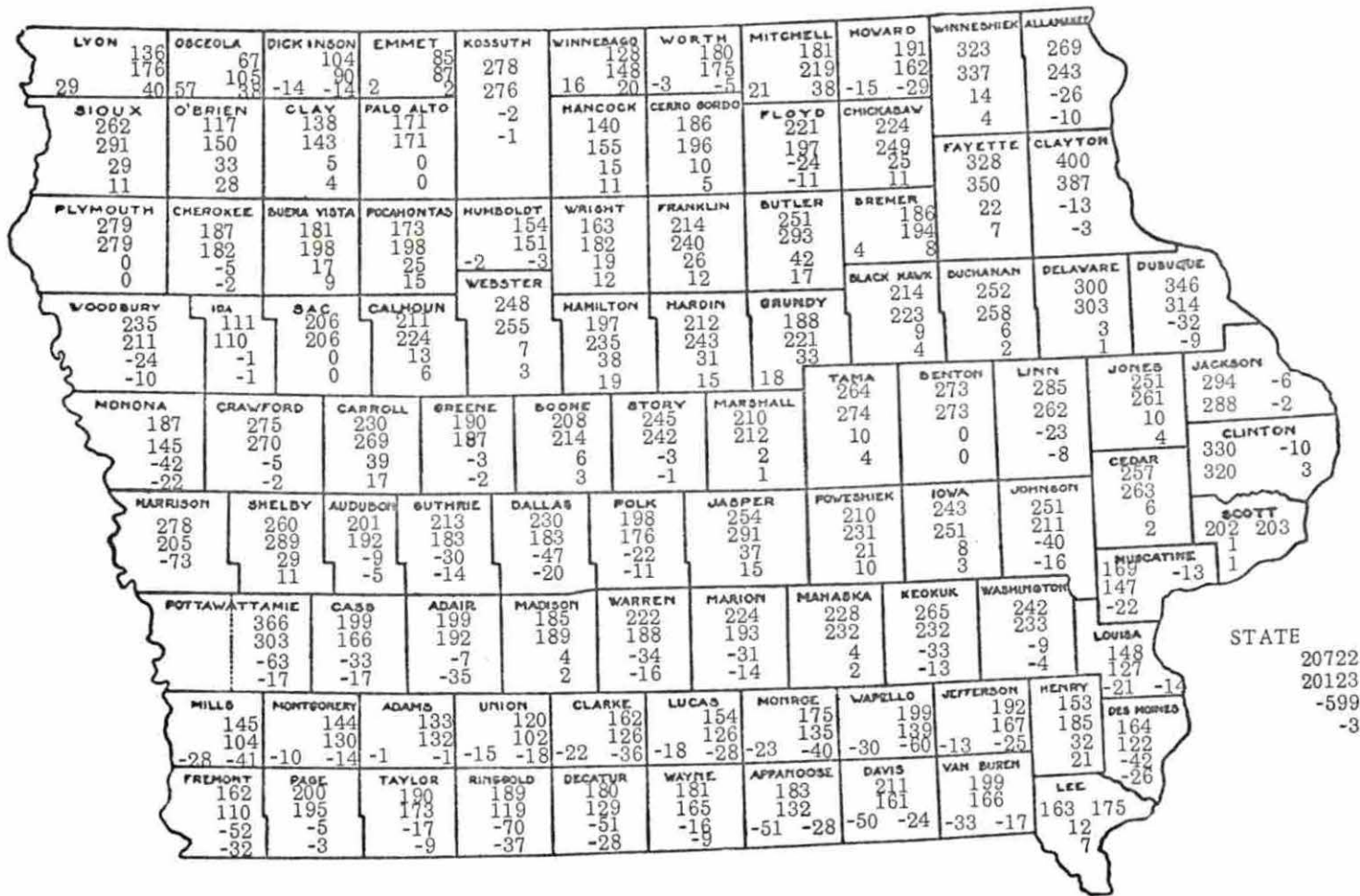
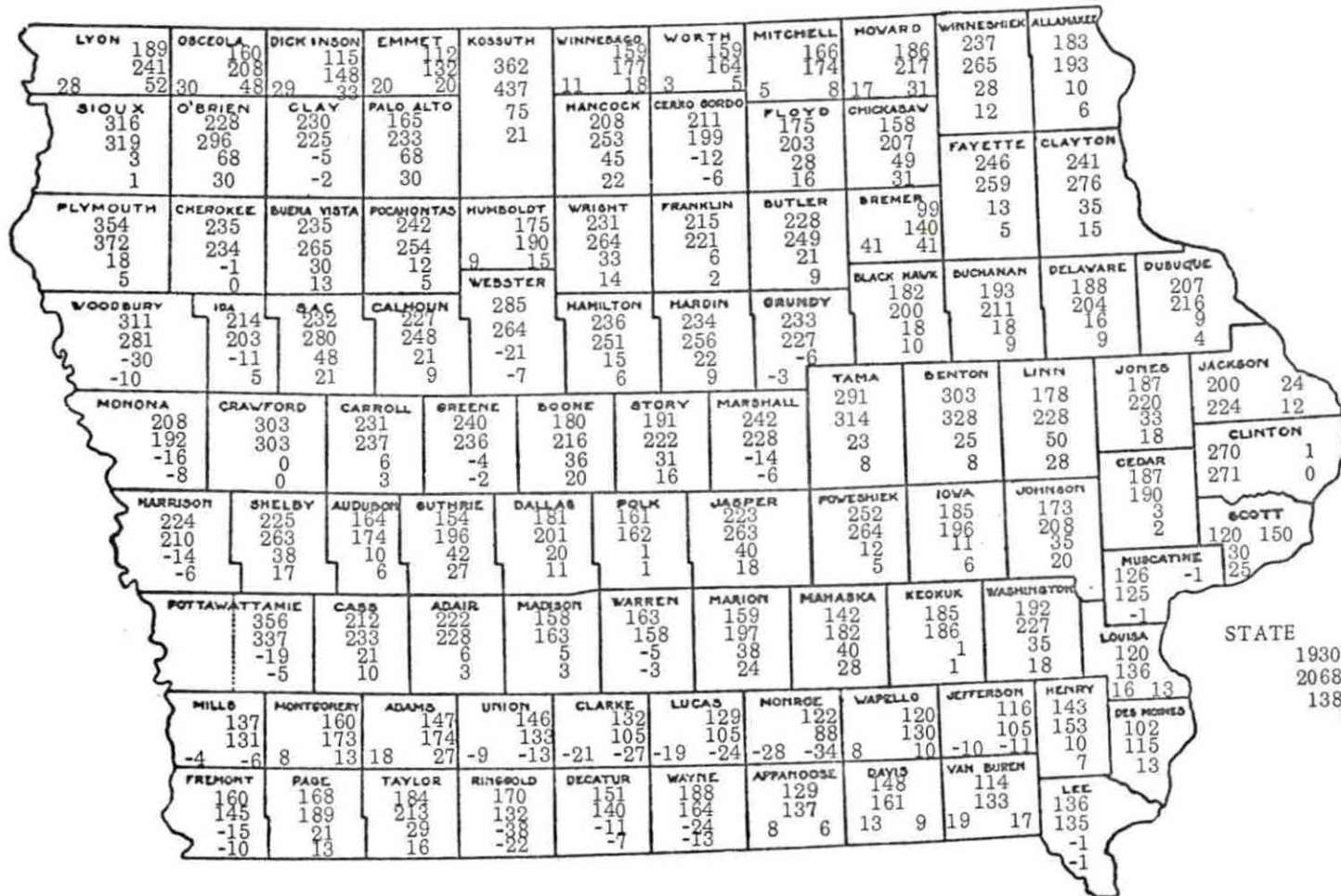


Figure 10. Change in the number of farms 220 to 259 acres by county for Iowa, 1940 to 1959

(Numbers top to bottom in each county: number of farms 220 to 259 acres in 1940, number of farms 220 to 259 acres in 1959, difference between 1940 and 1959, and percentage change in the number of farms 220 to 259 acres, 1940 to 1959.)



STATE  
 19302  
 20685  
 1383  
 7

Figure 11. Change in the number of farms 260 to 499 acres by county for Iowa, 1940 to 1959

(Numbers top to bottom in each county:  
number of farms 260 to 499 acres in 1940,  
number of farms 260 to 499 acres in 1959,  
difference between 1940 and 1959, and  
percentage change in the number of farms  
260 to 499 acres, 1940 to 1959.)

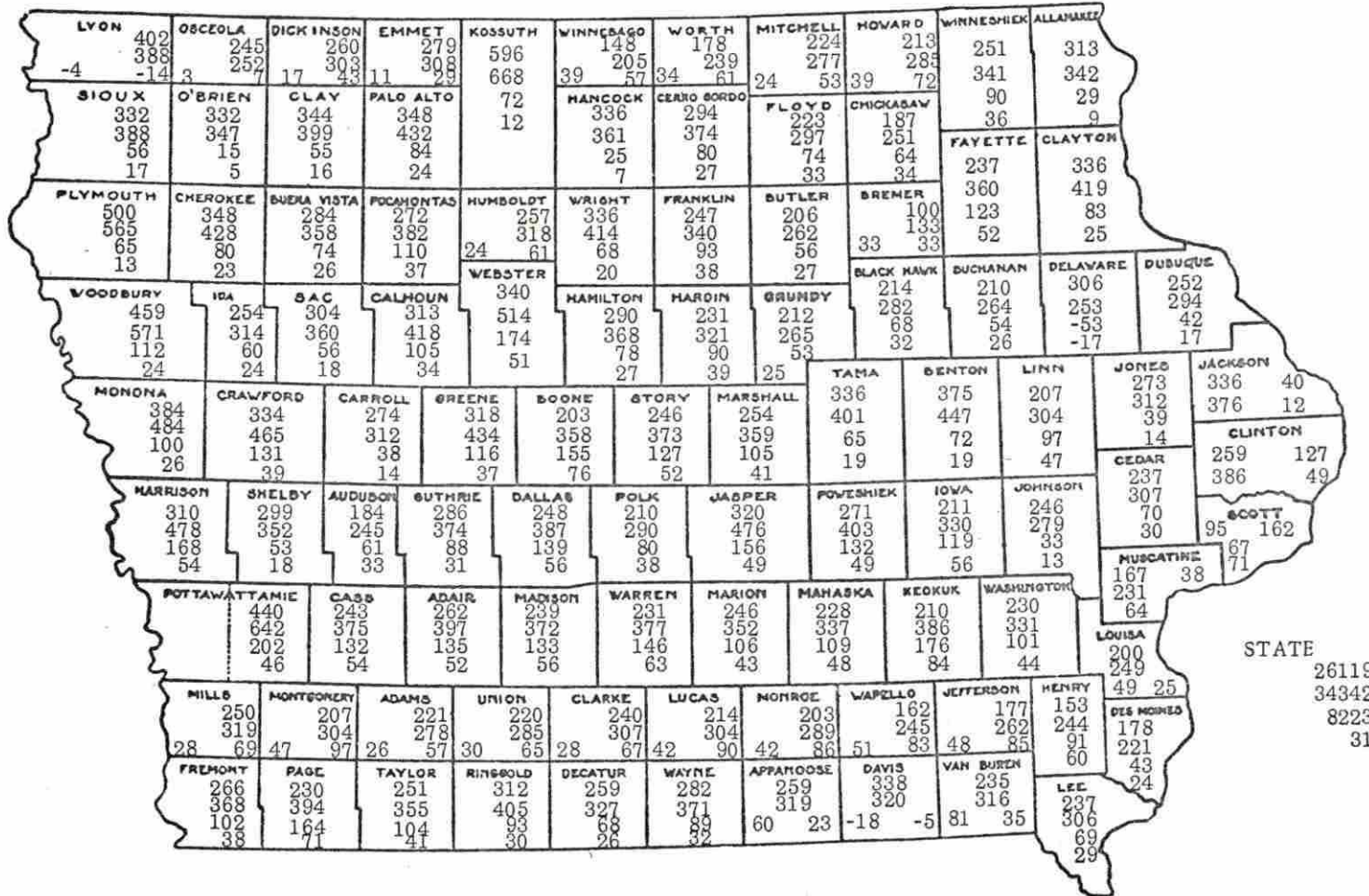
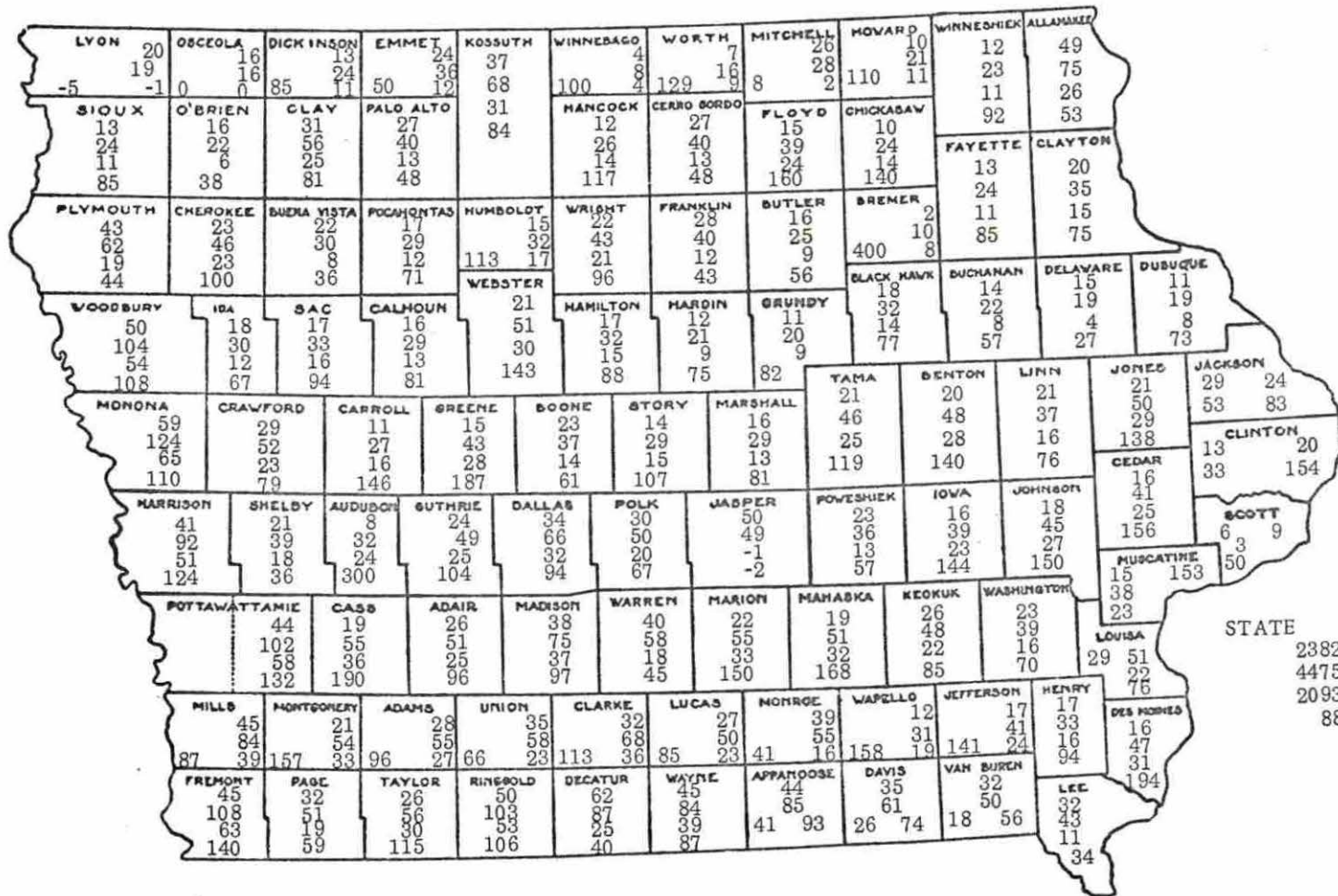


Figure 12. Change in the number of farms 500 to 999 acres by county for Iowa, 1940 to 1959

(Numbers top to bottom in each county:  
number of farms 500 to 999 acres in 1940,  
number of farms 500 to 999 acres in 1959,  
difference between 1940 and 1959, and  
percentage change in the number of farms  
500 to 999 acres, 1940 to 1959.)



65

farms falling in the 220 to 999 acre classification has increased in nearly every county in Iowa. Within this classification the largest absolute change was evidenced in farms in the 260 to 499 acre classification. Larger percentage increases were observed in the 500 to 999 acre farms, but it must be remembered that there were fewer farms in this group initially, so small absolute increases resulted in large percentage changes.

The general increase in the number of 220 to 999 acre farms is explained in part by the development of new machines and techniques which required more acres in order to provide for their efficient use. For example, a farmer who operated a 160 acre farm may have a realized net income of \$3000 to \$4000. To purchase one of the large tractors on the market today would take twice the amount of his net income, abstracting from the cost of the implements needed to complement the tractor. Farmers require higher incomes than the level mentioned to purchase such new machines. Since product price to the individual farmer is the same regardless of his output, one logical method of increasing income is to increase output. In many instances this adjustment took the form of an increase in the number of acres farmed.

The number of farms 1000 acres or more has increased. Although several counties showed increased numbers of farms over 1000 acres, no county had more than 20 more farms in this classification in 1959 than in 1940. Several counties showed



decreases or no change in the number of farms of this size.

Figure 13 shows the changes in number of farms 1000 acres or more for each county during the period studied. The largest increases in the number of large farms are shown to have occurred in southern Iowa. The increases in the number of very large farms are nearly negligible when we remember that there are more than 1000 farms in each county.

#### Average farm size

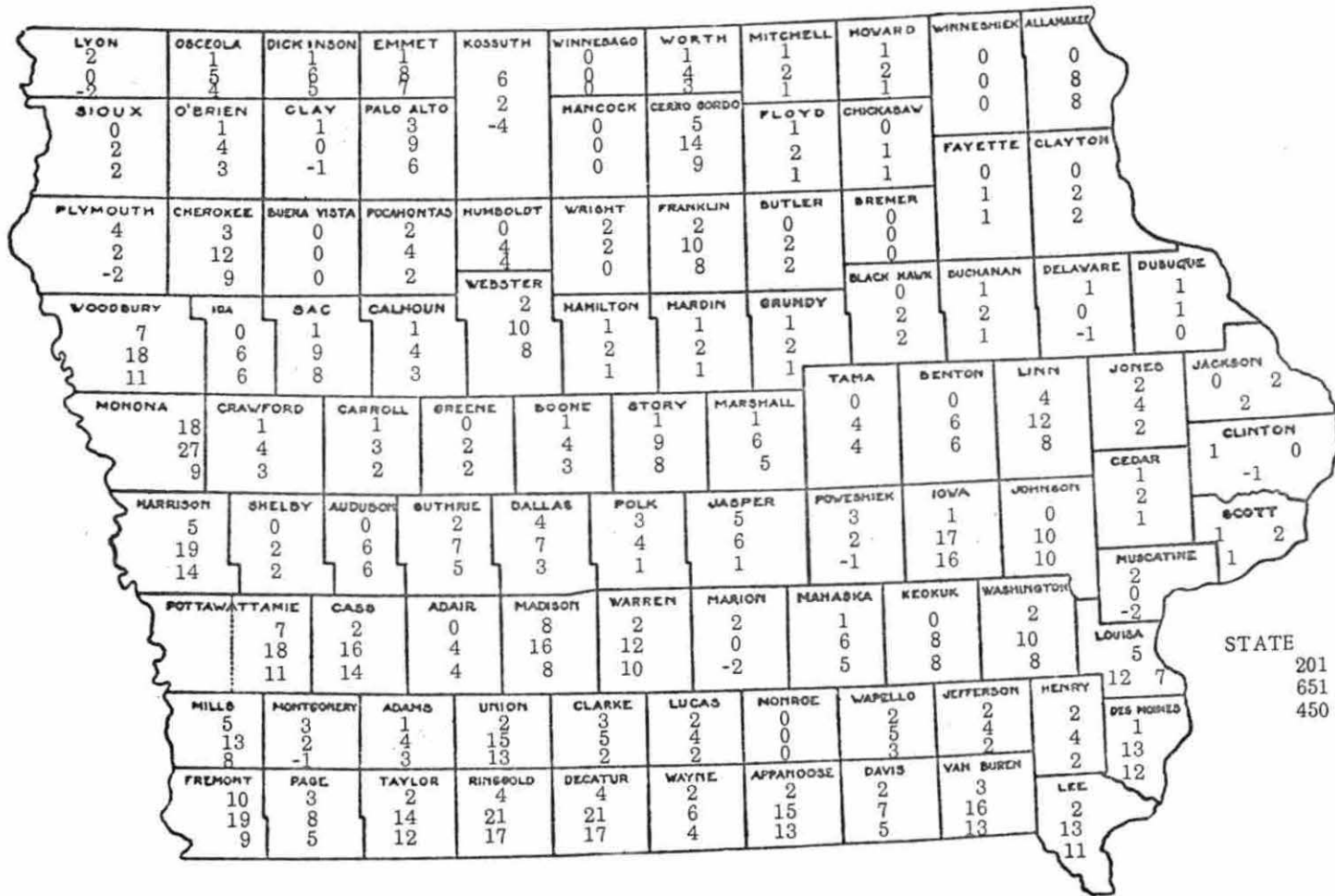
To complete the analysis of the changes experienced with respect to the number of farms, we now turn our attention to the consideration of changes in the average size of farms over the 20 year period studied.

Figure 14 shows the change in average farm size for each county. In 1940, the average size farm in Iowa was 160.1 acres. By 1959 the average size of Iowa farms had increased to 193.6. This may seem small when we observe that for the nation as a whole the average farm size is about 302 acres. However, the national figure includes range lands as well as small vegetable farms. Because Iowa is primarily a grain producing state, and has a large amount of livestock feeding, farms smaller than the national average have developed. The fact that Iowa farms are becoming larger is indicated by the 20.3% increase in the state average farm size during this 20 year period.

The increase in the average farm size has not been a

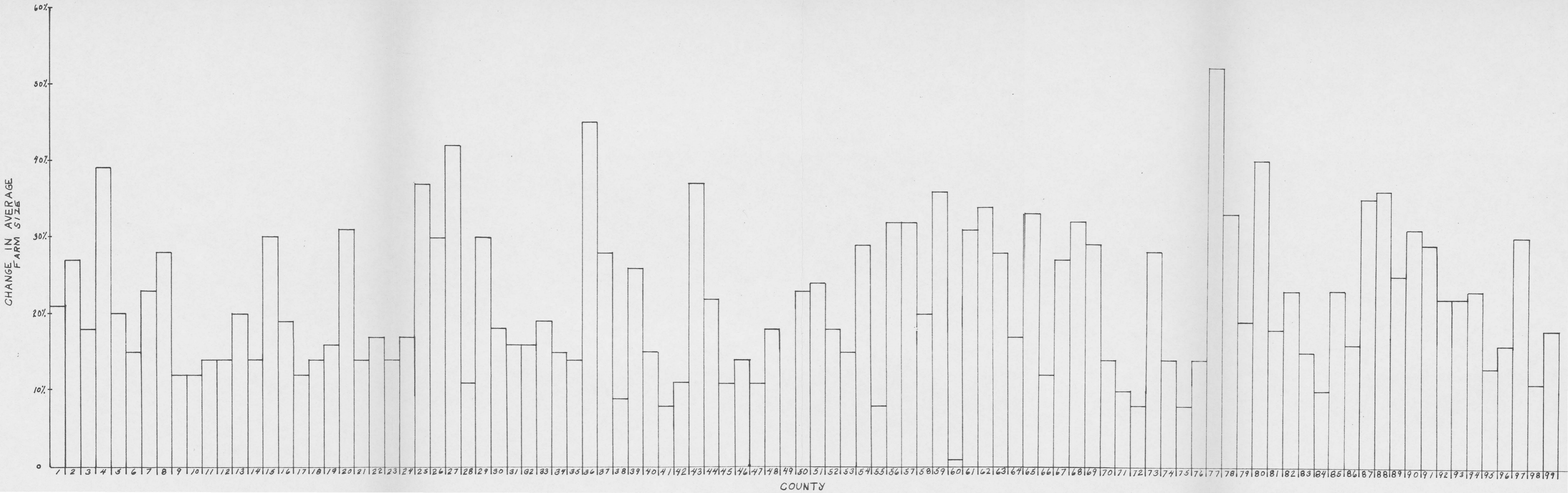
Figure 13. Change in the number of farms 1000 or more acres by county for Iowa, 1940 to 1959.

(Numbers top to bottom in each county:  
number of farms 1000 acres or more in  
1940, number of farms 1000 acres or more  
in 1959, difference between 1940 and 1959.)



STATE  
201  
651  
450

Figure 14. Percentage change in average farm size by county  
for Iowa, 1940 to 1959.



gradual phenomenon. The increase in farm size progressed slowly from 1940 to 1954. As a matter of fact, during that 15 year period, the state average farm size increased only 16.4 acres or from 160.1 acres to 176.5 acres. During the next 5 years the average farm size increased an additional 17.1 acres to 193.6 acres in 1959.

Not very long ago the increase in average farm size was due, in a large part, to the clearing and draining of previously untilled soil. This was not the case, however, from 1940 to 1959. During that period the total acres in Iowa farms remained nearly constant. The increase in farm size came almost entirely as a result of the decreasing number of farmers and farms.

Figure 14 shows a great deal of dispersion among the counties of the state with respect to changes in average farm size. Polk county's average farm size increased, on a percentage basis, more than that of any other county. In 1940 the average sized farm in Polk county was 101.8 acres. By 1959, 52.6 acres had been added to give an average farm size of 154.4 acres. In 1950 the average farm size for Polk county was only 114.8 acres, so the largest proportion of the increase occurred after 1950.

Since 1950, the city of Des Moines has provided an increased number of jobs for farmers on marginal farms who sought off-farm employment. In addition to the marginal farmers, many quite successful farmers left in anticipation

of more difficult situations in agriculture in the future. As the area of the city of Des Moines has increased, it has literally covered up the small farms that were formerly located on its periphery.

Fremont county, in the extreme southwestern corner of the state, experienced the second largest percentage increase in average farm size. An increase of 45.4% was facilitated by an 81.3 acre increase in the average farm size. Fremont county is in the trade area of the Omaha - Council Bluffs area. Further study would be necessary before any concrete statements can be made about the exact influence of the city on the average farm size.

As indicated in figure 1, Lyon county, extreme northwest corner of the state, had only three fewer farms in 1960 than in 1940. Consistent with this small decrease in the number of farms is that fact that Lyon county experienced the smallest increase in average farm size of any county in the state. The average farm size increased only 0.7% during the period studied. That is an increase of only 1.3 acres per farm on the average.

Figure 15 shows that the increase in average farm size in the southwestern, south central and southeastern parts of the state were 31%, 29.6% and 26.8% respectively. These percentage increases are nearly three times as large as those experienced in northwestern and north central Iowa. The percentage increases in these two sectors were 11.7% and 12.9% respectively. Table 2 shows the data upon which these percentages were based.

Figure 15. Percentage change in average farm size by area  
for Iowa, 1940 to 1959.



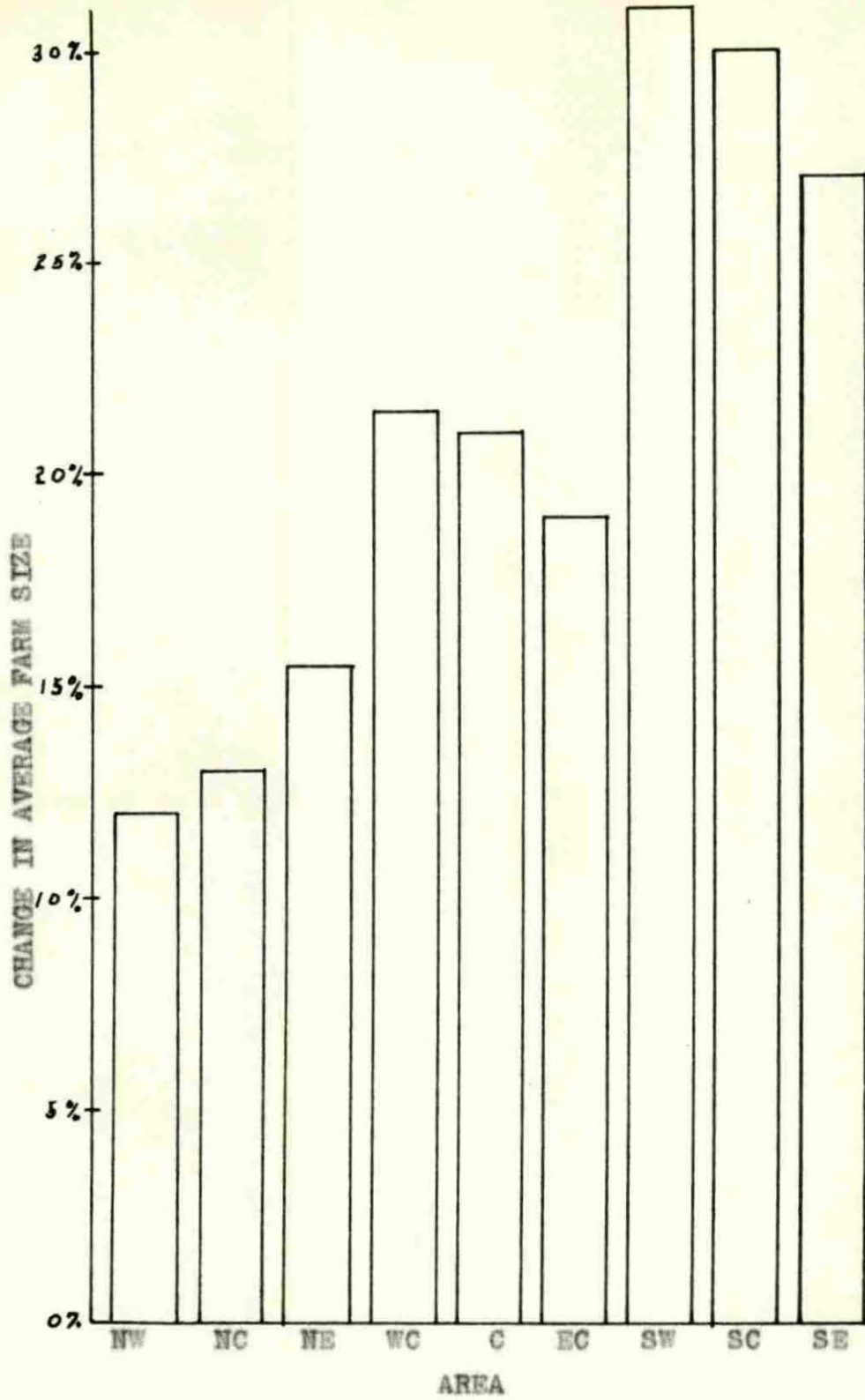


Table 2. Changes in the average size of farms by area for the state of Iowa 1940-1959

Area of Iowa	Average size of farms 1940 <sup>a</sup>	Average size of farms 1959 <sup>b</sup>	Difference
Northwest	184.5	206.1	21.6
North Central	171.1	193.2	22.1
Northeast	151.5	175.1	23.6
West Central	171.3	208.0	36.7
Central	153.9	186.7	32.8
East Central	151.4	179.5	28.1
Southwest	164.3	215.8	51.5
South Central	160.9	208.6	47.7
Southeast	147.2	186.7	39.5

<sup>a</sup>Based on data from 1940 U.S. Census of Agriculture

<sup>b</sup>Based on data from 1959 U.S. Census of Agriculture

The differential between the size and number of farms in the northern and southern parts of Iowa has some relationship to quality of the soil and climatic factors. It is a quite generally accepted idea that on the average, southern Iowa counties have poorer soils and less rainfall than northern Iowa counties. The Rural Development program of the Eisenhower administration and the Rural Areas Development program of the Kennedy administration aimed at helping farmers to help themselves through various types of educational programs, have accelerated the migration off the farm in southern Iowa in recent years.

Changes in tenure structure

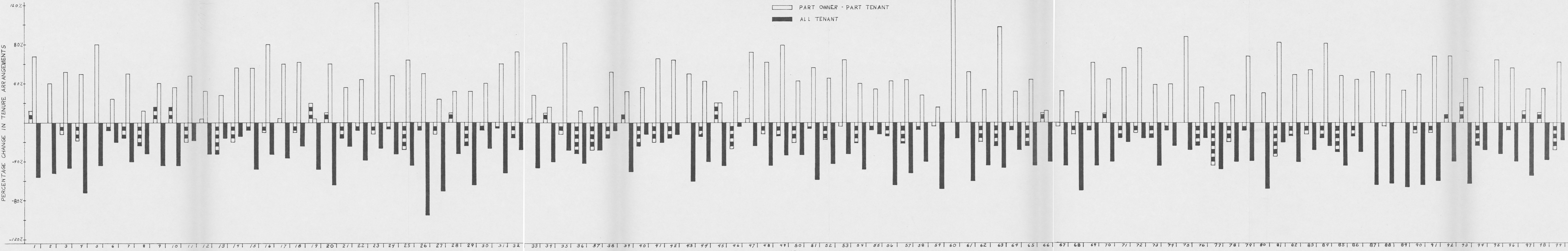
Changes in the tenure structure on Iowa farms by county are depicted in figure 16. During the period 1940 to 1959, the number of farms operated on a purely tenant basis decreased in every county in Iowa. The largest percentage decrease in tenant operated farms occurred in Davis county in southeastern Iowa. In 1940 there were 717 tenant operated farms in Davis county. During the 20 years studied, the number of tenant farms fell to 241, a decrease of about 94%. Other southern Iowa counties which showed large percentage decreases in the number of purely tenant operated farms were Appanoose, Clarke, Decatur, Des Moines, Lucas, Ringgold, Taylor, Union, Van Buren, Wapello and Warren. All of these counties experienced decreases in excess of 60% in the number of tenant operated farms. Northern Iowa counties experienced smaller percentage changes in the number of tenant farms than did the southern Iowa counties. Humbolt county had a decrease of only 6% in purely tenant farms from 1940 to 1959. The number of tenant operated farms in Hardin county decreased only about 10%.

In addition to showing the change in the number of tenant operated farms, figure 16 shows percentage changes in the number of farms operated by full owners and part owner - part tenant operators. Let us look first at the changed situation with respect to farms operated by owners. In only 22 counties in Iowa did the number of owner operators increase during the period studied. Of those showing increases, Howard county and

Figure 16. Percentage change in the number of farms operated by full owners, part owner - part tenant and tenant operators by county for Iowa, 1940 to 1959.

PERCENTAGE CHANGE IN TENURE ARRANGEMENTS

■■■ FULL OWNER  
 □ PART OWNER - PART TENANT  
 ■ ALL TENANT



COUNTY

Wayne county exhibited the largest percentage change. Both counties had 20% more owner operated farms in 1959 than in 1940. However, the decline in owner operated farms has been neither gradual nor continuous. In fact, census figures in 1945 and 1950 showed an increase in the number of owner operated farms. Since 1950 there has been a rapid decline in the number of farms operated by full owners.

Figure 16 shows that every county in the state had more farms operated on a part owner - part tenant basis in 1959 than in 1940. There are two explanations of the increase in owner-tenant operations which are worthy of consideration. First, as tenant operators accumulated surplus stocks of capital they purchased part of the land that they had previously rented. The establishment of governmental agencies such as the Federal Land Bank provided a cheap source of the capital needed to complete the purchase of land. Secondly, as full owners (farmers farming only land which they owned) improved their equity position they bought land which was left unoccupied by farmers who migrated to non-farm employment.

In Lyon county the first explanation is more accurate than the second. As pointed out in figure 1, Lyon county experienced a 0.2% decrease in number of farms from 1940 to 1959. To facilitate an increase, in the number of part owner - part tenant farms, in view of the fact that the number of farms has been nearly constant, farmers previously operating as tenants must have purchased some of the land which had been rented.

The second explanation is more appropriate for the situation in Appanoose county. Since there was nearly a 30% decrease in the number of farms from 1940 to 1959 and both the number of tenant operated and owner operated farms decreased, the number of part owner - part tenant farms increased as farmers who had previously operated as owners rented additional acres.

The decrease in the number of tenant operated farms in the last 20 years reflects a very basic change in the social structure of Iowa agriculture. Before the turn of the century the most common way for a farmer to become a land owner was to begin as a hired hand, after a few years become a tenant and, if things turned out well, terminate as an owner. Full equity in a farm was the goal of nearly all farmers. By 1959 the tenant class had experienced a large reduction in numbers. The rung on the so called "social ladder" of agriculture had been weakened.

The increase in part owner - part tenant farmers may well reflect a change in the goal of full equity, especially if owners are expanding their operations by renting more acres. Reference here is to full equity in the entire land area farmed by an individual farmer not necessarily to full equity in one tract or parcel of the total acreage farmed. Remember, in the not to distant past, full equity in the entire acreage farmed was the goal of all farmers.

Table 3 shows the number of farms operated by managers in

1940 and 1959 and the difference. Manager, as used here, refers to a person operating a farm, not as a tenant or as an owner operator, but as an agent or representative of the owner.

Table 3. Number of farms operated by managers by county for the state of Iowa, 1940 to 1959

County	1940 <sup>a</sup>	1959 <sup>b</sup>	Difference
State	1218	396	-822
Adair	5	2	-3
Adams	10	2	-8
Allamakee	8	3	-5
Appanoose	11	8	-3
Audubon	10	3	-7
Benton	9	8	-1
Black Hawk	29	7	-22
Boone	11	5	-6
Bremer	6	4	-2
Buchanan	25	4	-21
Buena Vista	8	3	-5
Butler	11	6	-5
Calhoun	8	3	-5
Carroll	19	3	-16
Cass	8	4	-4
Cedar	15	8	-7
Cerro Gordo	24	7	-17
Cherokee	8	4	-4
Chickasaw	4	1	-3
Clarke	6	4	-2
Clay	13	0	-13
Clayton	17	2	-15
Clinton	17	3	-14
Crawford	7	2	-5
Dallas	13	5	-8

<sup>a</sup>Based on data from the 1940 U.S. Census of Agriculture

<sup>b</sup>Based on data from the 1959 U.S. Census of Agriculture



Table 3. (Continued)

County	1940	1959	Difference
Davis	10	5	-5
Decatur	4	13	9
Delaware	11	2	-9
Des Moines	8	2	-6
Dickinson	4	1	-3
Dubuque	12	2	-10
Emmet	13	5	-8
Fayette	3	5	2
Floyd	12	5	-7
Franklin	22	4	-18
Fremont	22	4	-18
Greene	9	1	-8
Grundy	10	1	-9
Guthrie	17	4	-13
Hamilton	7	3	-4
Hancock	19	1	-18
Hardin	13	6	-7
Harrison	17	3	-14
Henry	6	8	2
Howard	6	4	-2
Humbolt	14	1	-13
Ida	8	0	-8
Iowa	21	8	-13
Jackson	13	4	-9
Jasper	15	5	-10
Jefferson	11	2	-9
Johnson	11	0	-11
Jones	17	5	-12
Keokuk	7	8	1
Kossuth	12	2	-10
Lee	16	2	-14
Linn	31	12	-19
Louisa	4	4	0
Lucas	6	1	-5
Lyon	6	5	-1
Madison	16	3	-13
Mahaska	8	6	-2
Marion	5	2	-3

Table 3. (Continued)

County	1940	1959	Difference
Marshall	13	5	-8
Mills	7	5	-2
Mitchell	9	4	-5
Monona	17	8	-9
Monroe	6	7	1
Montgomery	17	2	-15
Muscatine	18	2	-16
O'Brien	13	1	-12
Osceola	4	0	-4
Page	15	6	-9
Palo Alto	9	2	-7
Plymouth	16	3	-13
Pocahontas	10	1	-9
Polk	28	10	-18
Pottawattamie	29	4	-25
Poweshiek	5	3	-2
Ringgold	5	5	0
Sac	10	0	-10
Scott	16	7	-9
Shelby	10	5	-5
Sioux	8	2	-6
Story	20	3	-17
Tama	21	4	-17
Taylor	23	1	-22
Union	6	4	-2
Van Buren	8	4	-4
Wapello	12	2	-10
Warren	21	5	-16
Washington	11	3	-8
Wayne	4	4	0
Webster	20	4	-16
Winnebago	4	2	-2
Winneshiek	11	4	-7
Woodbury	29	21	-8
Worth	5	1	-4
Wright	10	2	-8

Nearly every county in Iowa had fewer farms operated by managers in 1940 than in 1959. The decrease in the number of manager operated farms was larger in Pottawattamie county than in any other county in Iowa. In 1940 there were 29 farms operated by managers in Pottawattamie county; by 1959 only four remained in operation. Increases in the number of manager operated farms were observed in only five counties; Decature, Fayette, Henry, Keokuk and Monroe. These counties, except for Fayette, are located in the southern part of Iowa.

To illustrate the aggregative changes in tenure structure, let us refer to the case of Cherokee county. During the period studied there was a decrease of 221 in the number of farms in Cherokee county. During the same period the number of tenant operated farms decreased by 279, the number of owner operated farms decreased by 58 and the number of farms operated by managers decreased by 4. On the other hand, the number of part owner - part tenant farms increased by 120. The situation in Cherokee county illustrates the general tendency throughout the state. The number of part owner - part tenant operated increased while the number of tenant operated, owner operated and manager operated farms decreased.

As shown in figure 16, the percentage change in the number of tenant operated farms was larger than the percentage change in the number of owner operated farms with but few exceptions. The difficulties in agriculture have been more detrimental to tenant operators than to owner operators due to

the uncertainties connected with existing types of leases.

The analysis presented thus far has shown the more easily observable facts about Iowa agriculture such as changes in the number of farms and average farm size. More specifically, changes in the distribution of farms by acreage groups and changes in the predominating tenure structure were indicated.

#### Changes in Resource Use

While the above facts are worthy of consideration, they do not provide much information to explain why the changes took place. The changes in the number of farms and so on are symptoms of more basic causal relationships. These relationships are those involving the alterations which have been experienced in the use of major resources of land, labor, capital and management in Iowa farming.

Land has been considered as the most basic agricultural resource. Land acreage in Iowa has remained constant for the last few years. Only a small amount of new cropland has been added to Iowa's land base. With the acreage of land remaining constant, how have changes in land, as such, affected the structure and organization of Iowa farms? The answer to this question lies in the changing value of land (measured in dollars) over time.

On the national level the index of land values has shown a continual increase since the mid 1930's. In 1933 the index of farm real estate was at 42 (1947 - 49 = 100). By 1959 this

index was 169 and in 1961 it was 175.

The trend in Iowa has been in the same direction. Recent figures for Iowa show that farm real estate values continue to rise. In 1959 the index of farm real estate in Iowa was 157 (1947 - 49 = 100). The 1960 figure was even higher. Changes in land use and in the development of new crops and improved varieties of existing crops have facilitated changes in Iowa farming.

The composition and absolute volume of the agricultural labor force has changed greatly. In the United States there were 32 million people in agriculture in 1933. In 1961 there were only 15 million remaining in agriculture.<sup>7</sup> The changes observed in the number of farm operators working off their farms for 100 or more days per year show that the earning opportunities of labor employed in agriculture haven't been large enough to provide an adequate level of living for many farmers. Labor and management are so closely related that making any distinction between the two requires subjective evaluation and determination.

The social ladder by which a farm-hand could become a land owner has been changed. This is not to say that young farmers have no opportunity, but that their approach must be different than in the past.

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<sup>7</sup>Geoffrey S. Shepherd. Farm income policy: a long run approach. Unpublished manuscript. Ditto. Ames, Iowa, Department of Economics, Iowa State University of Science and Technology. ca. 1962. p. 93.

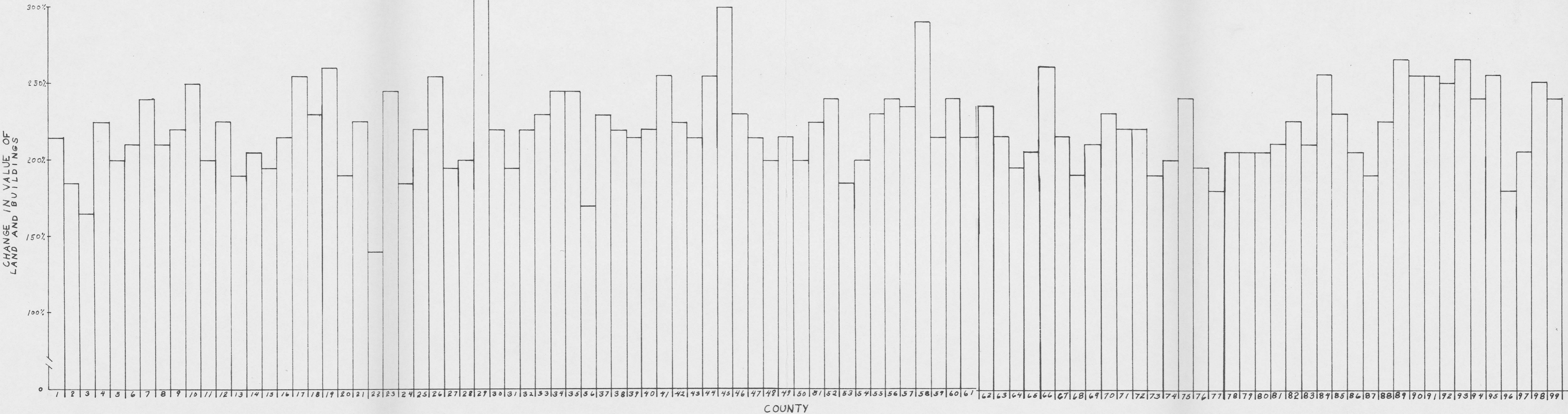
Capital has become an important input in Iowa agriculture. To completely analyse the changes in capital inputs two considerations are worthy of note. First, we are interested in operating capital. Second, we must look at durable capital items. However, there is no accurate measure of operating capital. The inadequacy of farm records and the complexities of the price system make the available estimates of operating capital, at best, good guesses. Census figures do provide quite reliable estimates of durable capital inputs. It is quite probable that operating capital is highly correlated with durable capital inputs.

#### Changes in value of land and buildings

Let us look more specifically at the changes that have been experienced in Iowa in the use of the major resources of land, labor, capital and management during the last 20 years. Figure 17 shows the changes in the value of land and buildings from 1940 to 1959. Data representing the value of land and buildings is used because it is readily available in agricultural census figures. Changes in land inputs would be more accurately reflected in figures showing only the value of land. Often the value of a particular set of buildings has caused the recorded sale value of land and buildings to be unrealistically high.

Referring again to figure 17, we see that every county in the state exhibited an increase in the value of land and build-

Figure 17. Percentage change in value of land and buildings by county for Iowa, 1940 to 1959.





ings from 1940 to 1959. The average value of land and buildings in Iowa in 1959 was \$254.34 per acre. That was 222.8% or \$175.55 more than in 1940. These figures are not corrected for inflation but even so they reflect that the per acre value of land and buildings has increased since 1940.

Des Moines county showed the largest percentage increase in the value of land and buildings during the period studied. In 1959 the value of land and buildings in Des Moines county was \$296.28, about 310% larger than in 1940. In Howard county the 1959 average value of land and buildings was \$198.12. This was an increase of about 300% over the 1940 value. This is not to say that the dollar value of land and buildings in Des Moines county was larger than any other county in Iowa, but, simply that the percentage change was the largest. Actually, Grundy county, in central Iowa, had the highest land values in 1959. The average land value in Grundy county in 1959 was \$373.55, nearly \$120 above the state average. In 1940, Grundy county was preceded only by Scott county in value of land and buildings.

Allamakee and Clayton counties experienced smaller percentage changes in land value than any other counties in Iowa with 165% and 140% respectively. In 1940, the average per acre value of land and buildings was \$43.90 in Allamakee county and \$69.11 in Clayton county. It is interesting to note that these two counties join one another while the two counties showing the largest percentage change in land value were in different parts of the state. Again, Allamakee and Clayton

counties did not have the lowest average per acre value of land and buildings in the state in either 1940 or 1959, but merely the smallest percentage change between those two dates. In 1940, Dallas county had a per acre value of land and buildings of only \$30.16. In 1959, Monroe county had the low value of only \$91.74 per acre.

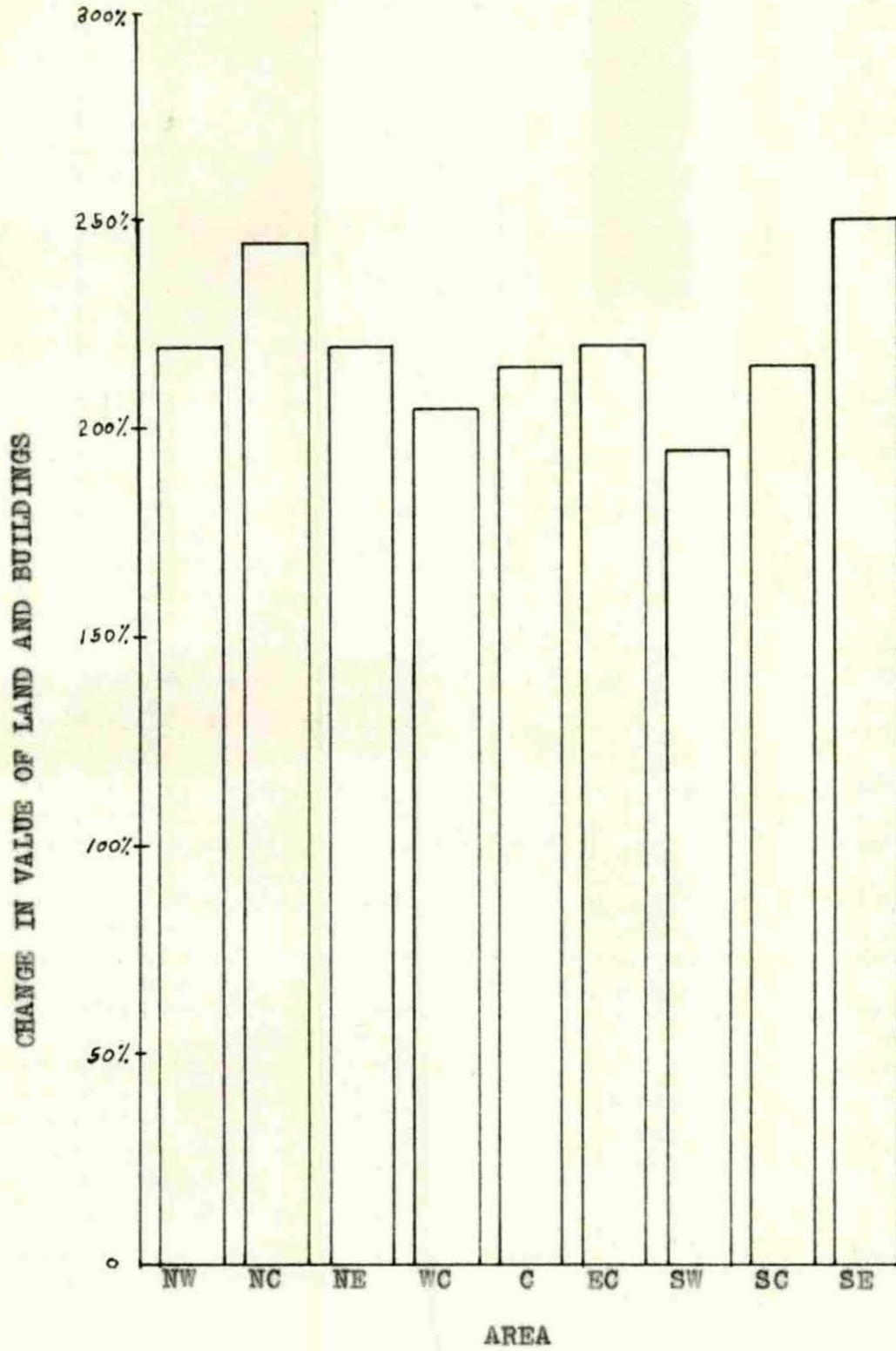
Figure 18 shows that various areas of the state of Iowa experienced differential percentage changes in the value of land and buildings from 1940 to 1959. The southwestern section experienced the largest percentage change. Actually, all areas of the state except the northeast and southeast exhibited between a 200% to 220% increase in the average value of land and buildings.

#### Changes in the farm labor force

One of the most mobile factor inputs in agriculture is labor. Changes in other factor inputs such as capital and land acres per farm have necessitated reallocation of agriculture's labor force. Labor, however, does not leave agriculture as easily as the above statement implies. Social customs, capital limitations, educational limitations, costs of moving, lack of information about existing alternative job opportunities and many others are impediments to the transfer of labor.

To arrive at an estimate of the farm labor force requires a good deal of subjective reasoning. A decision must be

Figure 18. Percentage change in the average value of land and buildings, 1940 to 1959.



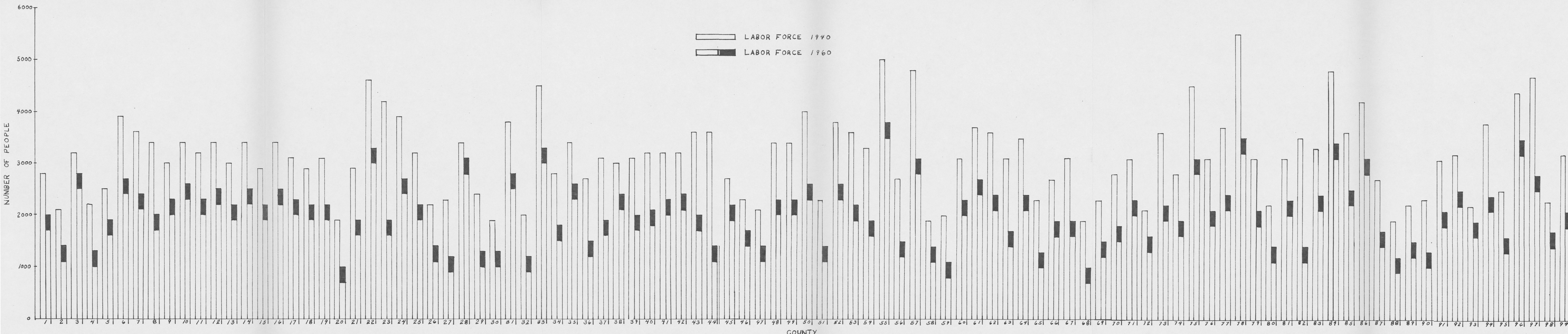
reached as to what groups of agricultural workers to include to obtain a reasonable estimate of the actual farm labor force.

The farm labor force is composed of family labor, hired labor, and, of course, operator labor. The labor considerations relating to operators is quite straight forward. There is one operator per farm business. The considerations relating to family and hired labor are not so simple to explain. There are rough estimates available of the family and hired labor employed on Iowa farms. In the past the estimates of these last two types of farm labor were even less refined than those available at present. The methods used in estimating the farm labor force in this study are explained in detail in the section dealing with estimation procedures. Briefly, farm operators, family labor and hired labor working 150 or more days were included in the present estimate of the farm labor force.

Figure 19 shows the absolute changes in the farm labor force by county for the state of Iowa from 1940 to 1960. In keeping with the decrease in number and increase in average size of Iowa farms, the size of the farm labor force decreased in every county in Iowa. There has been a great deal of variation in the changes in the size of the labor force in the various counties in Iowa.

Pottawattamie county had a larger agricultural labor force in 1940 than any other county in Iowa. In 1940 there were roughly 5500 people in the farm labor force in Pottawattamie

Figure 19. Change in the farm labor force by county for Iowa, 1940 to 1960.



county. Only 10 other counties in Iowa had more than 4000 people working in agriculture in 1960. The absolute level of the farm labor force was much lower in 1960 than in 1940. The county with the largest farm labor force in 1959 (Kossuth county) had only about 3800 in the agricultural labor force.

Clinton county and Henry county experienced decreases of about 2300 and 2200 respectively in the size of the farm labor force. Of the 2300 persons from Clinton county who left the agricultural labor force, 314 were farm operators and about 1300 were hired laborers. The remainder were accounted for by the decline in unpaid family labor, and to a small extent, the changed definition of what constituted a farm. Henry county was characterized by about the same situation.

While Clinton county showed the largest change in the farm labor force from 1940 to 1960, Delaware county showed the smallest change. In 1940 there were 3438 people in the farm labor force in this county. By 1960 the size of the farm labor force had declined only to 3104, a decrease of 334.

It is difficult to explain why there was such a small decrease in the agricultural labor force of Delaware county while Clinton county showed such a large decrease. The two counties are quite close together in geographical location. It may well be that since it is close to the industrial complex of the Chicago area, there have been more employment opportunities for labor leaving agriculture. There may have been more information available in Clinton county on the alternative



employment opportunities too.

Reference to figure 20 shows that all areas of the state exhibited a decline in the size of the agricultural labor force. South central Iowa experienced the largest percentage decline in people employed in agriculture during the period of 1940 to 1960. While there was a decrease of about 44% in the farm labor force in south central Iowa, the farm labor force in northeastern Iowa decreased only about 26% during the same period. As shown by table 4, the percentage decrease in the farm labor force in southern Iowa was larger during the study period than in northern Iowa.

Table 4. Changes in the farm labor force by area for the state 1940-1960

Area of Iowa	Number in farm labor force 1940 <sup>a</sup>	Number in farm labor force 1960 <sup>b</sup>	Difference
Northwest	36194	25710	-10484
North Central	33835	24458	-9377
Northeast	39731	30493	-9238
West Central	39145	25745	-13400
Central	41897	28583	-13314
East Central	36809	24861	-11948
Southwest	26750	17136	-9614
South Central	25539	14948	-10591
Southeast	28760	17892	-10868
Total	308660	209826	-98834

<sup>a</sup>Adapted from data in 1940 U.S. Population Census

<sup>b</sup>Adapted from data in 1960 U.S. Population Census

There are two explanations for the differential rates of change in the farm labor force. First, there have been more impediments to labor mobility in the northern part of Iowa. There was not much non-agricultural industry in northern Iowa. As a result the alternative employment opportunities were limited. Second, the need for labor transfer was not as acute in northern Iowa as in southern Iowa. It might be that the value productivity of labor in northern Iowa was adequate to provide an acceptable level of living.

A further consideration of the data upon which figures 19 and 20 are based reveals that the number of hired workers working 150 or more days per year on farms has decreased in a manner similar to the decrease in the total labor force. There were only 200 to 250 hired workers in agriculture working 150 or more days in the various counties in Iowa in 1960. In 1940 there were more than 500 hired workers in several counties in Iowa.

The number of farm operators working off their farms for 100 or more days was higher in 1959 than in 1940 in most counties in Iowa. As shown in figure 21, only 1/3 of the counties in the state had fewer farm operators working in non-farm employment in 1940 than in 1959. Polk county had 545 (about 65%) fewer farm operators working off farms 100 or more days during the same period. At the other extreme, Ida county had 35 more (140%) operators working off farms 100 or more days per year in 1940 than in 1959. It may well be that adjustments which

Figure 20. Percentage change in size of farm labor force by area for Iowa, 1940 to 1960.

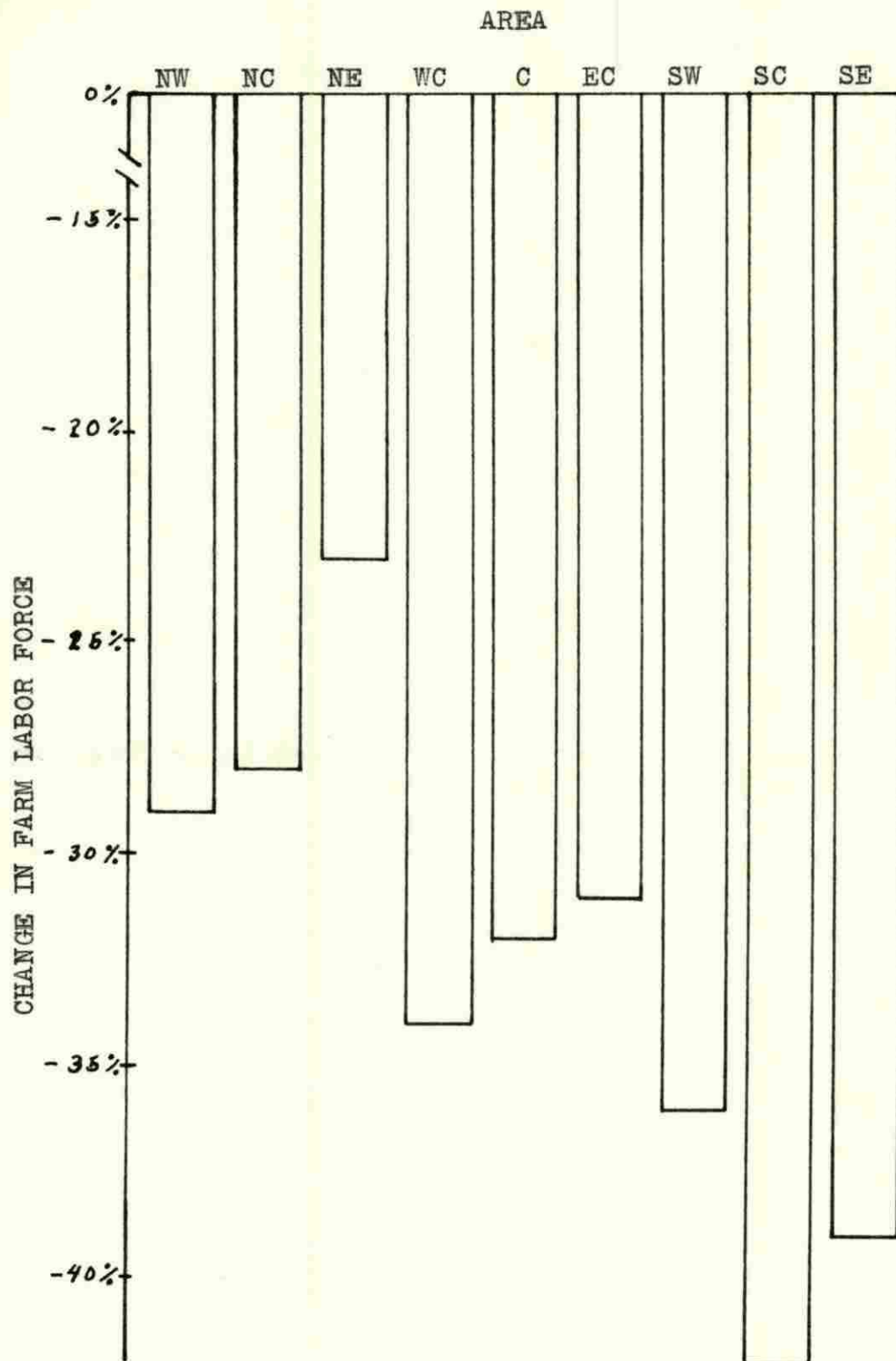
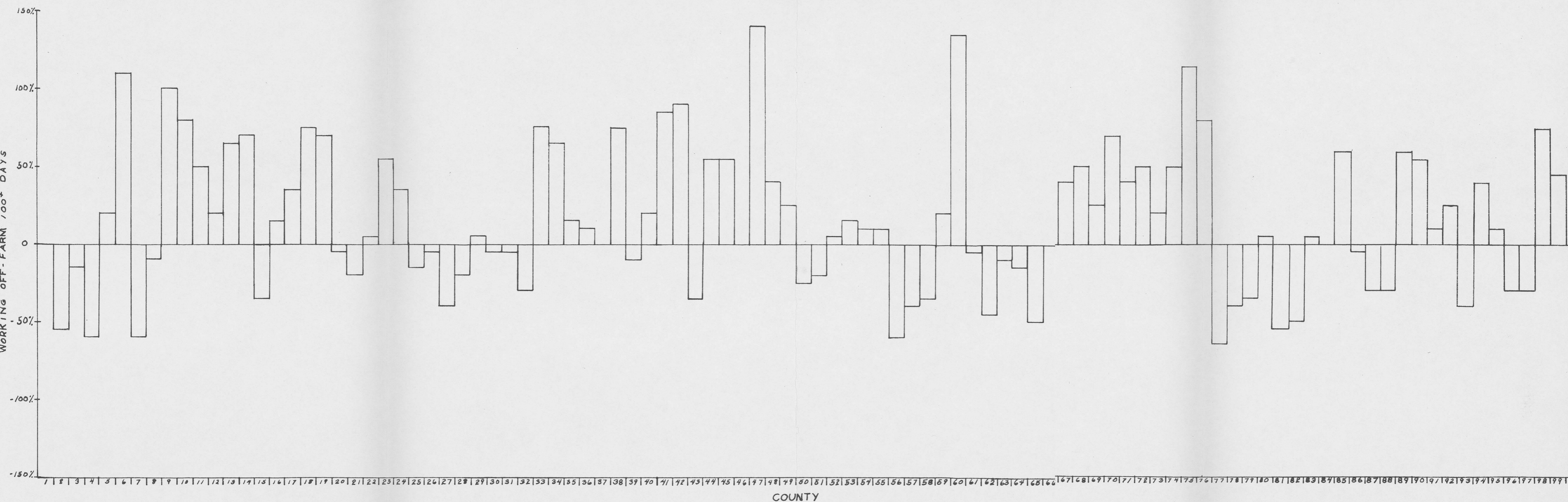


Figure 21. Percentage change in the number of farm operators working off farms 100 or more days per year by county for Iowa, 1940 to 1959.



have taken place in counties showing a decrease in the size and composition of the farm labor force have begun to bring returns to labor employed in agriculture into balance with returns to labor employed in non-agricultural industry.

When we look at the percentage changes in the number of farm operators working off farms 100 or more days per year in the various counties in Iowa, and more specifically, in the areas of the state, we see that southeastern, south central, southeastern and east central parts of the state had a decrease in the number of operators working off their farms during 1940 and 1959. The northern, central and western areas of the state had increases in the number of farm operators working off farms 100 or more days per year. The counties which exhibit positive numbers in figure 22 are those in which returns to labor in agriculture are not in balance with returns to labor in other industries. If labor returns were equal or nearly so in all industries, farm operators would not seek non-farm employment to supplement their incomes. The various governmental programs, which have worked specifically in southern Iowa, have made noticeable progress toward equitable labor returns in that area. It is obvious that the same type of aid programs used in southern Iowa would have been beneficial in the rest of the state.

Accurate measurement of managerial input is difficult, if not impossible, to obtain. Management input is, however, reflected to some extent in the dollar value of products sold. More specifically, returns to management are returns that

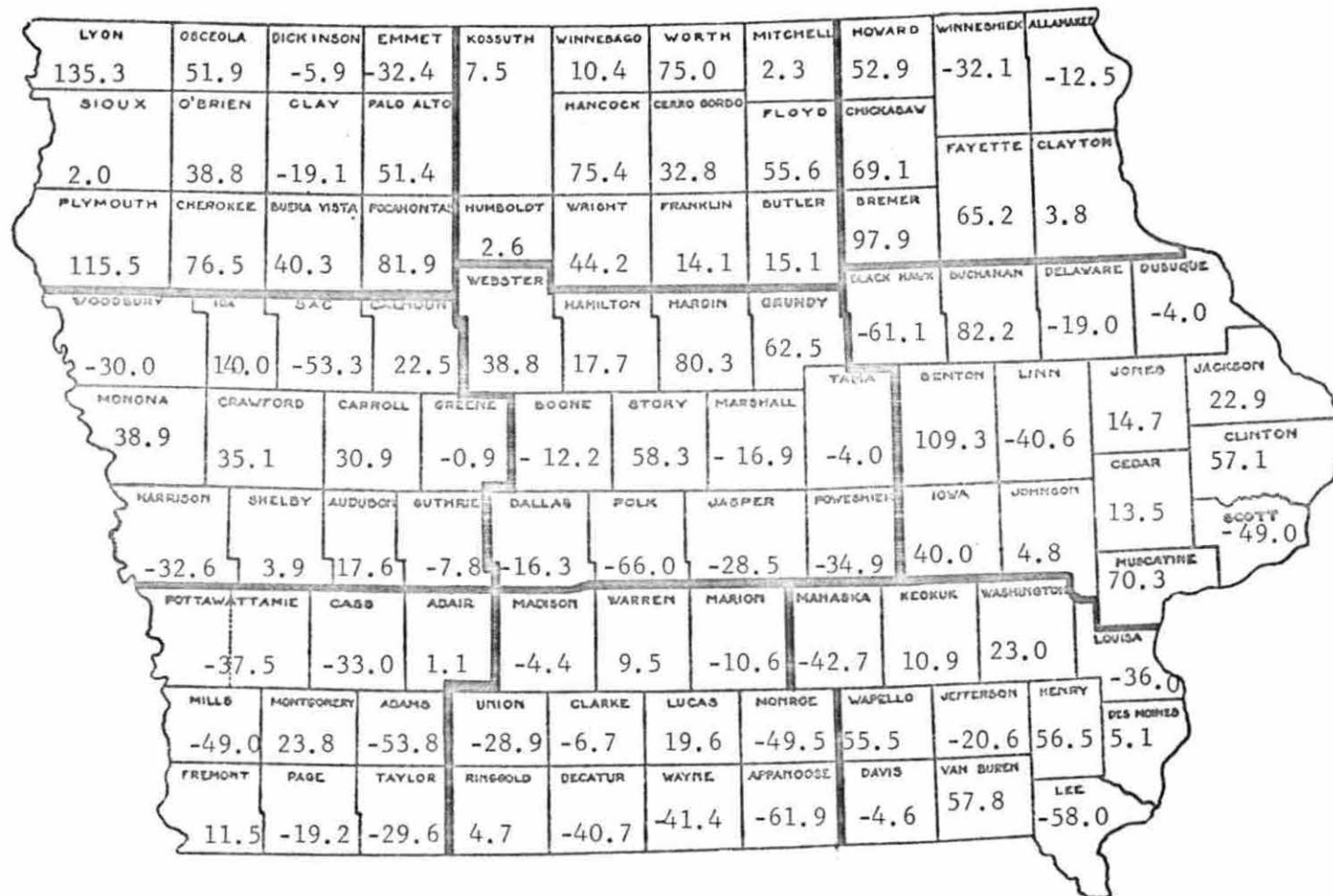


Figure 22. Percentage change in the number of farm operators working off farms 100 or more days per year, 1940 to 1960



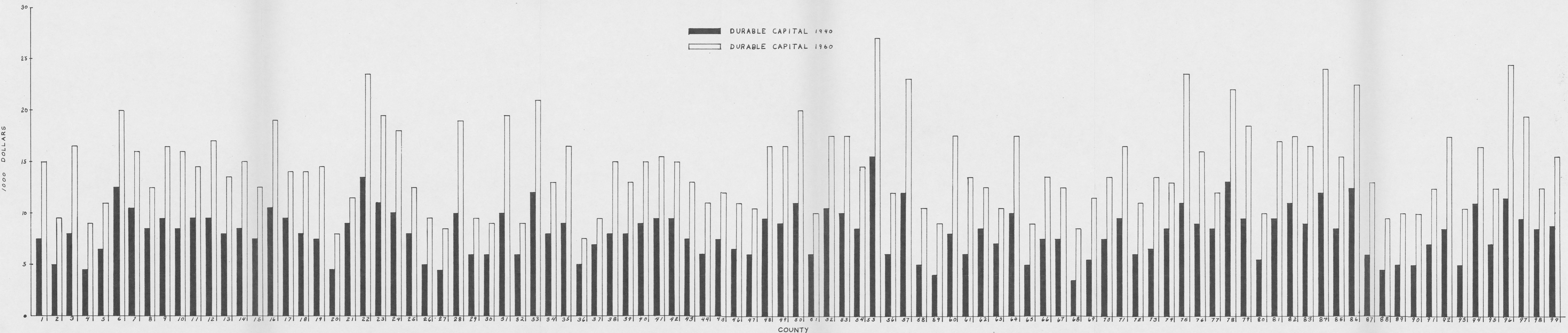
result from accurate prediction of the future. One way to compute management return is to determine returns to all factors except management. The residual may be termed management return. The management input of Iowa farmers on the average has improved as the general level of formal education has been raised. The development of new and the expansion of existing information media has also contributed to improving the level of management input on farms. Evidence presented thus far implies that in many, although not in all, cases the less efficient managers have been forced to leave the farm in order to maintain a satisfactory level of living.

Turning our attention to figure 23 we note the changes that have taken place in durable capital items during the last 20 years. Since the volume of durable capital items is highly correlated with the volume of operating capital, inputs of durable capital items have been selected as an indicator of the amount of capital being employed in Iowa agriculture. Durable capital items have been placed into three classifications:

1. power items
2. machinery items
3. breeding stock items.

The first classification, power items, includes tractors, trucks, horses and mules. Corn pickers and combines were used to indicate the investment in machinery items. Included in the breeding stock classification were milking or dairy cows, beef cows, sows and gilts and ewes.

Figure 23. Change in input of durable capital items by county for Iowa, 1940 to 1960.



We see that while land inputs have remained nearly constant and labor inputs have decreased, inputs of durable capital items on Iowa farms have increased by large amounts. With reference to counties, the increase in value of durable capital inputs was larger in Winneshiek county than in any other county in Iowa. In 1940 there was about \$11,500,000 in selected durable capital items employed in farming in Winneshiek county. By 1959 about \$13,000,000 worth of additional durable capital items were being used in Winneshiek county bringing the total to about \$24,500,000.

Clay county, on the other hand, had an increase in the use of durable capital items of only \$2,500,000 from 1940 to 1959. Clay county typifies the situation in many other counties in northern and north central Iowa. Most of the increase in durable capital items in these counties came before 1940. During the period from 1940 to 1960 the change in capital inputs was very small in the northern and north central parts of the state. It is probably true that northern Iowa farms could have been organized so as to produce the output realized in 1960 with considerably less capital input than was actually used.

The northeastern and southeastern areas in Iowa had the largest percentage increase in the value of power items (\$61,745,000 or 172% and \$41,444,000 or 162% respectively) used on farms during the years studied. In 1960 the value of durable capital items was \$97,565,000 in northeastern Iowa and \$66,916,000 in southeastern Iowa. The value of capital items is expressed in terms of constant 1947-49 dollars. The large

The large increase in the use of power items in northeastern and southeastern Iowa, indicated in figure 24, have come primarily as a result of increases in use of tractors and trucks. There has been a decline in the number of horses and mules used for power on Iowa farms from 1940 to 1960. The percentage change in dollar input of power items was smaller in south central Iowa than in any other area of the state. However, the increase in the dollar value (\$27,023,000) was still more than 100% from 1940 to 1960.

Looking at figure 25 we see that south central Iowa had a larger percentage increase in the dollar value of machinery items during the study period than any other part of Iowa. In 1960 the value of durable capital items in south central Iowa was \$14,474,000 (\$13,670,000 or 1700% more than in 1940). Northeastern Iowa farmers increased their investment in machinery by about 1200% (\$25,945,000) from 1940 to 1960. The change in machinery inputs in the remainder of the state, especially the northern and central areas of Iowa, was less than in the south central section. This may be explained by the same reasoning that illustrated the changes in the use of power items in the northern areas relative to southern Iowa -- that being the era of rapid increase in the use of machines of all types in northern Iowa had already occurred by 1940.

Turning to the area considerations with respect to the input of capital in the form of breeding stock in 1960 as compared with 1940 as shown in figure 26, we see that the parts

Figure 24. Percentage change in the input of power items by area for Iowa, 1940 to 1960, in constant 1947 to 1949 dollars.

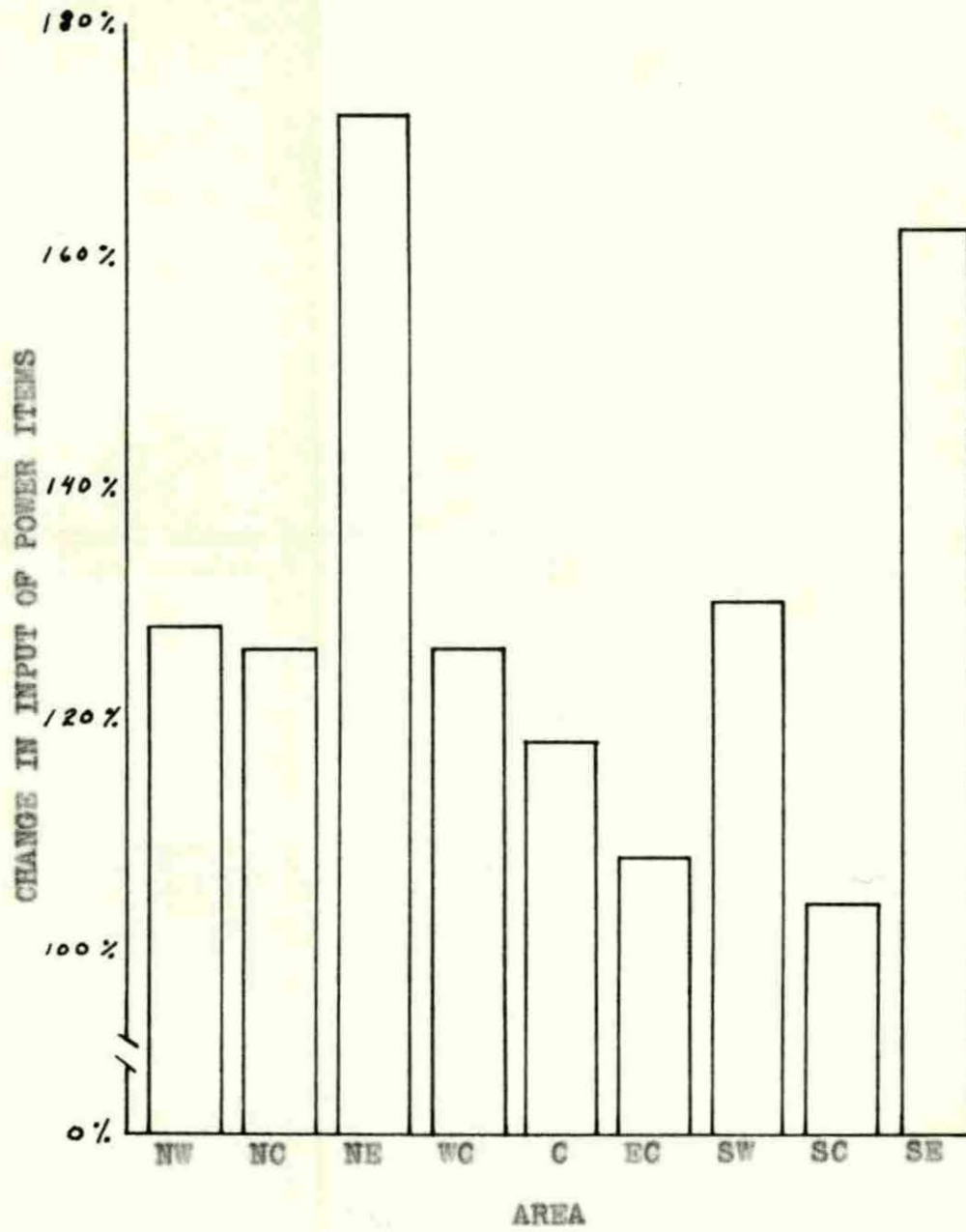


Figure 25. Percentage change in machinery input by area for Iowa, 1940 to 1960, in constant 1947 to 1949 dollars.



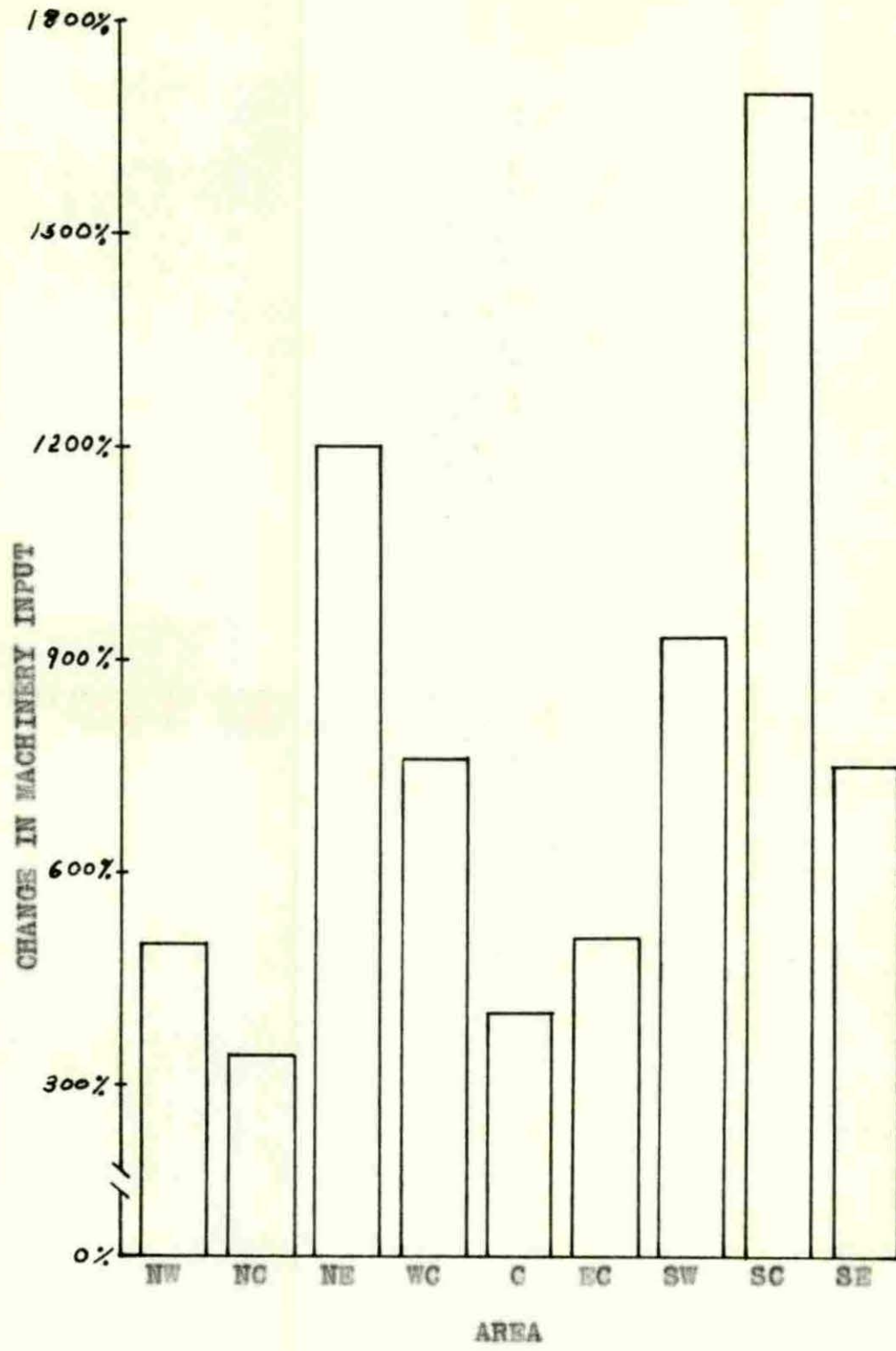
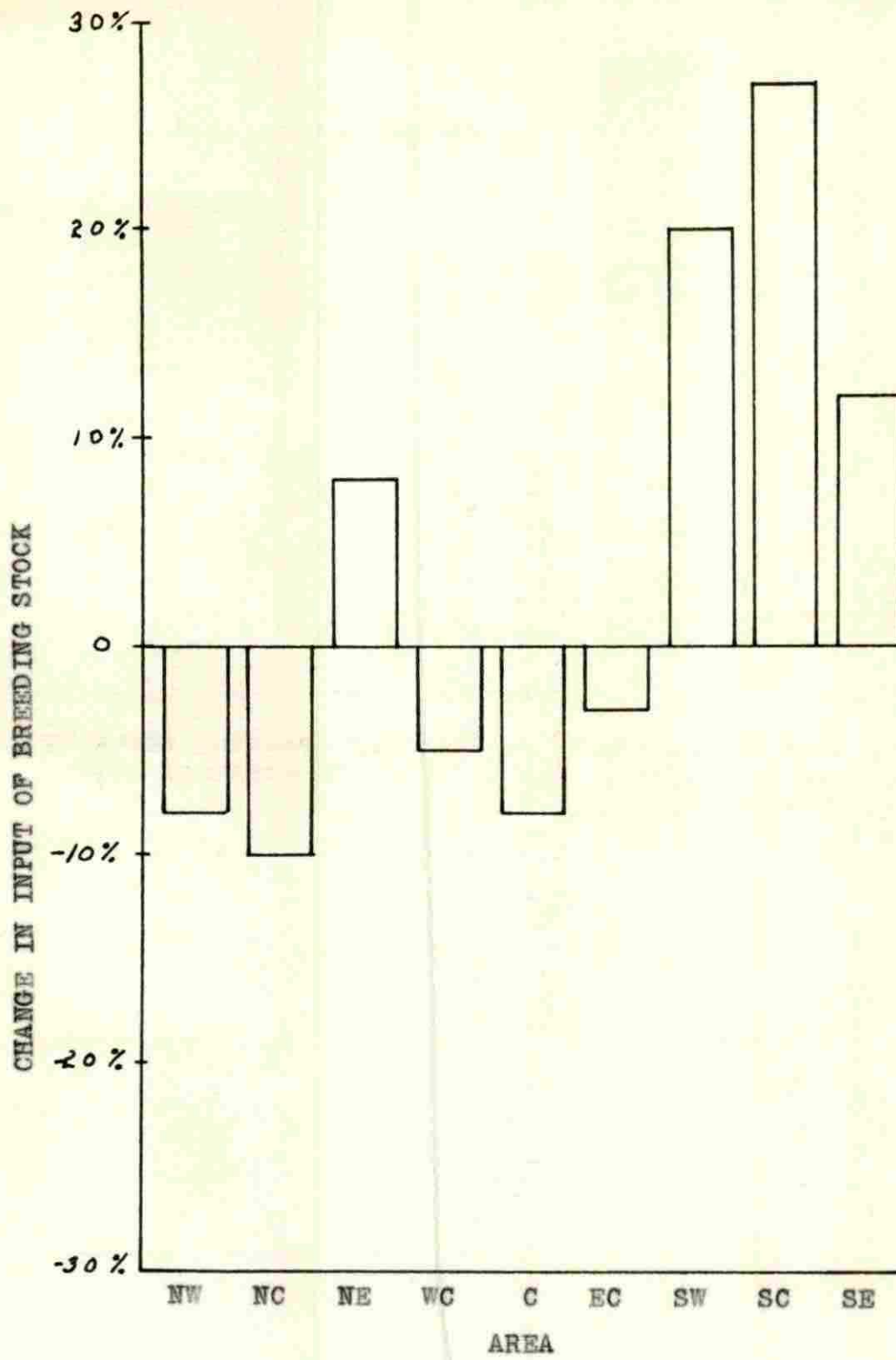


Figure 26. Percentage change in input of breeding stock by area for Iowa, 1940 to 1960, in constant 1947 to 1949 dollars.

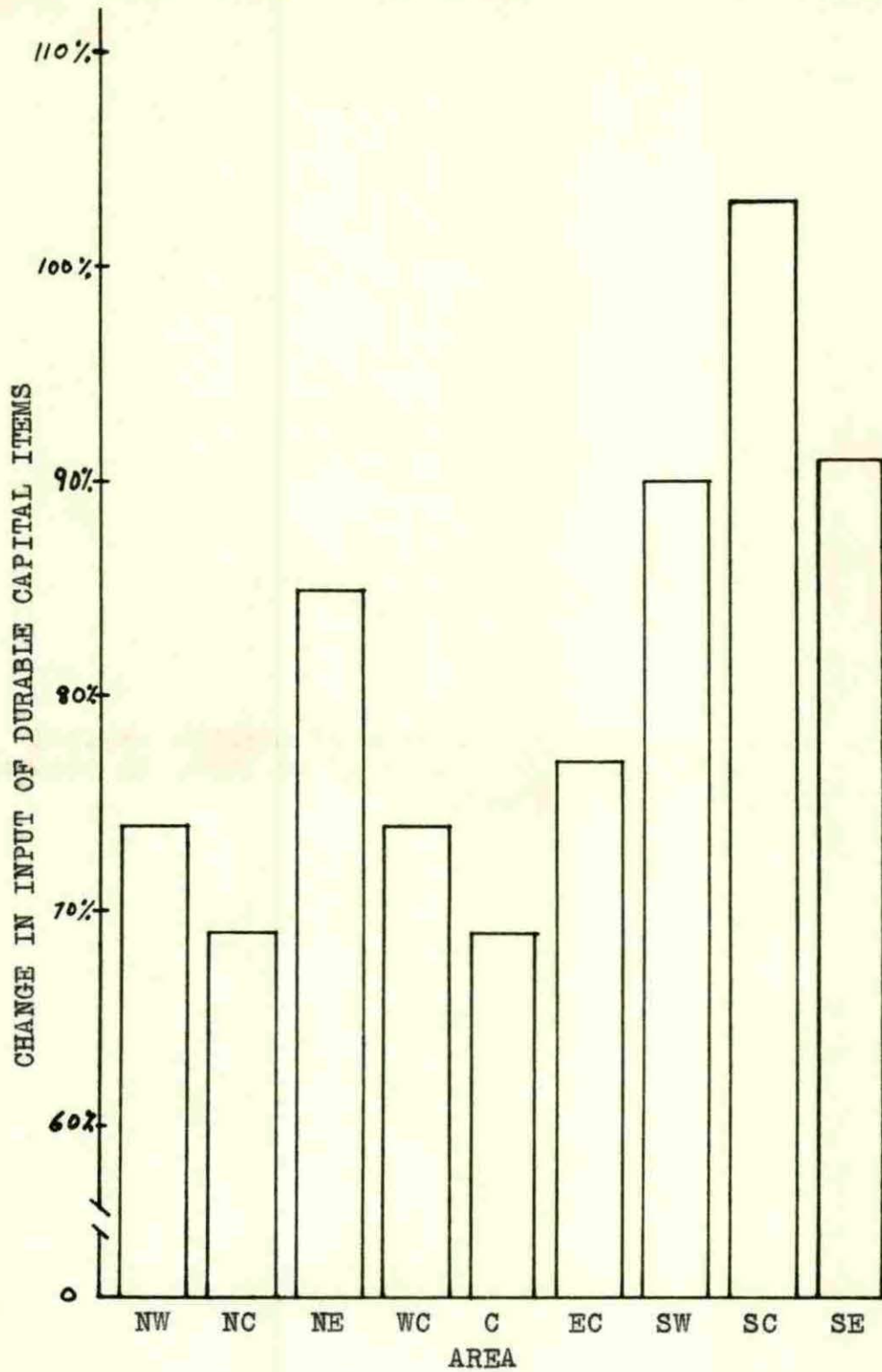


of Iowa commonly referred to as the grain producing region had smaller amounts of capital in breeding stock in 1960 than in 1940. The shift from beef and dairy cow herds to feeder cattle operations coupled with increased numbers of both feeder pigs and lambs in northern and central Iowa in the last 20 years explains the drop in investment in breeding stock in those areas.

The climatic and soil conditions in southern Iowa have led farmers in that area to increase investment in breeding stock. Since the variability in weather from year to year is quite great in southern Iowa, many farmers have tried to stabilize their incomes by choosing livestock enterprises which over time, have exhibited small amounts of variation in returns. Relatively, beef cow herds and dairy cow herds have yielded more stable returns over time than the various feeding enterprises. The increase in investment in breeding stock (\$5,721,000) in northeast Iowa is explained by the increased emphasis placed on dairying in that part of the state during the last 20 years or more.

In figure 27 we see the aggregative picture of the changes in total durable capital inputs for the various areas of Iowa from 1940 to 1960. In 1940 the value of durable capital items used in northwest, north central, northeast, west central, central, east central, southwest, south central and southeast was \$103,110,000; \$100,021,000; \$107,584,000; \$97,293,000; \$114,694,000; \$102,368,000; \$60,142,000; \$56,042,000; \$68,123,000

Figure 27. Percentage change in input of durable capital items by area for Iowa, 1940 to 1960, in constant 1947 to 1949 dollars.



respectively. In 1960 the corresponding values were \$179,596,000; \$168,696,000; \$198,753,000; \$169,811,000; \$194,072,000; \$180,868,000; \$114,303,000; \$113,522,000 and \$129,813,000. The percentage increase in the employment of durable capital items was larger in southern Iowa than in northern Iowa during this period. The aggregate percentage change in durable capital items was lower in northern Iowa for two reasons. First, the decrease in the input of breeding stock depressed the average. Second, by 1940 northern Iowa had all ready made most of the necessary additions to capital inputs.

The organization of agriculture in Iowa was very different in 1959 and 1960 than in 1940. The changes in the size and composition of farms and the farm labor force that have taken place in Iowa during the last 20 or 21 years is typical of the changes which have taken place in agriculture throughout the United States.

## TRENDS AND THEIR IMPLICATIONS

It was shown that the structure and organization of Iowa agriculture changed noticeably during the period from 1940-1959. Simply because some change has been effected in Iowa agriculture in the past 20 or more years, it can not be said that the industry of agriculture is in balance with the rest of the economy. It is not the purpose of this study to outline those characteristics which would depict Iowa agriculture as a balanced industry, but rather to show what changes may be expected to take place in Iowa agriculture if the adjustments which take place in the future are of the same general nature as those experienced from 1940 to 1959.

Some may say that because of a more adequate understanding of the problems of agriculture in general and Iowa agriculture in particular, the difficulties in Iowa agriculture will be corrected quickly and painlessly. While farmers, legislators and research workers have much more data available relating to agriculture now than 20 years ago it is difficult to say, based on the effectiveness of the programs which have been adopted, that they have a better understanding of the "farm problem" now than they did earlier. The above statements are not meant to paint a dark picture of the future for Iowa farmers, but only to indicate that the complexities of the socio-economic problems of Iowa agriculture require time to facilitate effective solution.



Let us look first at the changes in the number of farm operator opportunities over the 20 years from 1940 to 1960. Table 5 shows the number of farms in the state and the decrease in the number of farm operator opportunities. It is assumed here that the decrease in the number of farms in Iowa reflects a decrease in the farm operator opportunities.

Table 5. Change in the number of farm operator opportunities in Iowa, 1940-1959

Date	Number of farms <sup>a</sup>	Change in number of operator opportunities
1940	213,318	
1945	208,934	- 4,384
1950	203,159	- 5,775
1954	192,933	-10,226
1959	174,707	-18,226
		Total -38,611

<sup>a</sup>Adapted from U.S. Census of Agriculture

It is apparent from the data in table 5 that the number of farm operator opportunities decreased at an increasing rate since 1940. Although we can determine the magnitude of the decrease in operator opportunities it is not nearly so easy to establish the number of farm operator opportunities which actually existed in Iowa in 1940, 1959 or any year between these two dates.

If we were to average the total decrease over the 20

years studied, it could be said that there was a decrease of about 1,930 per year in the number of farm operator opportunities in Iowa. However, since the decrease of 18,226 in the number of operator opportunities in the period 1954-1959 was considerably larger than any other period in the past, a more accurate picture of the decline in operator opportunities can be obtained by analyzing that period. The average yearly decline in the number of farm operator opportunities from 1954 to 1959 was 3,645.

Now let us try to establish the number of farm operator opportunities available to young men planning to farm in 1960. If it is assumed that decline in the number of farm operators from 1954 to 1959 continued from 1959 to 1960 there would have been 171,062 farms in Iowa in 1960. Since the average work life of farm operators in Iowa is about 30 years, there would have been 5,702 farms vacated during 1960. Again assuming the same rate of decline in the number of opportunities from 1960 to 1961 as in the 1954 to 1959 period, there remained 2,057 farms available at the beginning of 1961.

How many of the young men who were reared on farms in Iowa could have moved to Iowa farms if they desired? In 1960 there were 31,020 males in agriculture in Iowa in the 15 to 19 year age group. This means that on the average 6,204 farm boys become 20 years old each year. It could be said that there were 4,147 young men who couldn't find farming opportunities. While this is true in itself, it does not reflect the

situation that exists accurately. A study by Kaldor indicates that 38.0% (approximately 40%) of the farm boys in Iowa planned to farm.<sup>1</sup> At the rate of 40% it means that about 2,482 of the farm boys who became 20 years old in 1960 planned to farm. If the trends in operator opportunities experienced in the period 1954 to 1959 continued two more years 33% of the farm boys in Iowa had an opportunity to become a farm operator in 1961. The remaining 67% had to seek employment elsewhere.

Assuming the same percentage decrease in operator opportunities from 1960 to 1964 as occurred between 1954 and 1959 (about 9% over the five year period) there would be 158,983 farms in Iowa in 1964. If the number of males becoming 20 years old from 1960 to 1970 decreases at the same rate as during the period from 1950 to 1960 there would be about 27,701 young men in the 15 to 19 age group in agriculture in 1970. In 1964 there would be about 29,361 males in the rural 15 to 19 year age group. This would mean that in 1964 about 5,873 young men in agriculture would become 20 years old. If 40% of the 5,873 who became 20 years old in 1964 planned to farm about 2,349 young men were seeking farming opportunities.

Assuming the average work life of farm operators is 30 years in 1964 there would be 5,299 farms vacated in 1964. The average yearly decline in the number of operator opportunities

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<sup>1</sup>Donald R. Kaldor, Eber Eldridge, Lee G. Burchinal and I. W. Arthur. Iowa Agr. and Home Ec. Exp. Sta. Res. Bul. 508: 611-651. 1962. p. 611.

from 1960 to 1964 would be 3,145. In other words there would be about 2,154 farm operator opportunities in Iowa in 1964.<sup>4</sup> It is very probable the same technique could be applied to establish estimates for 10 or more years and still be fairly accurate.

If the percentage decline in the number of farm operator opportunities follows the pattern established in 1954 to 1959 and the number of males in agriculture who become 20 years old decreases in a similar fashion, sometime in the not too distant future, perhaps even in the next 20 years, the number of operator opportunities would be equal to the number of young men seeking such opportunities. This is evidenced by the fact that in 1961, based on the assumptions outlined above, there were 2,482 farm boys competing for 2,057 farm operator opportunities. In 1964 there may well be about 2,349 young men to fill about 2,154 openings in Iowa farming. It should be pointed out that nothing has been said about the level of income to be expected from the farms which become available to young men wishing to farm. Evidence presented here simply indicates that there are and will continue to be opportunities for young men wishing to farm. It may be that during the first few years of their farming careers many

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<sup>4</sup>The number of operator opportunities in 1961 was computed by projecting continuous absolute changes. The number of operator opportunities in 1964 was found by extending percentage changes which accounts for the apparent change in the direction of the trend.

young men may seek off farm employment to supplement their incomes.

In keeping with the idea that the number of farms will decrease for some years to come, it may be expected that the average acreage per farm in the state will increase. If the increase in average farm size from 1960 to 1979 were to be of the magnitude experienced from 1940 to 1959 (about 21% over the 20 years) the average farm size in Iowa in 1979 would be 234.2 acres, an increase of 40.6 acres over the 1959 figure.

If we look once more at the figures presented in the section on capital and the data upon which figure 27 is based, we can obtain an idea of the changes in capital inputs during the period studied. In 1940 there was \$811,377,000 worth of durable capital items employed on Iowa farms. By 1960 the value of durable capital items employed on Iowa farms (in terms of 1947-49 dollars) was \$1,449,434,000, an increase of \$638,057,000 during the 21 years studied. While these figures indicate nothing directly about the changes in or level of total capital needs on Iowa farms, it is implied, at least generally, that the total value of capital inputs has increased in a similar manner.

It is doubtful that the rate of increase in total capital inputs on Iowa farms will be as great from 1961 to 1980 as it was from 1940 to 1950. It is my feeling that the era of really large increases in capital inputs on Iowa farms has past. There may be an increase in investment in certain types

of automatic equipment complementing livestock feeding enterprises, but increase investment in automation is not expected to increase total capital investment in the state as much as did the switch from animal power to machine power from 1940 to 1960. Rather than the 78.6% increase in durable capital items experienced from 1940 to 1960 the increase in these items from 1961 to 1980 may be more on the order of 30% to 40%. The anticipated decrease in the rate of increase in the use of capital items may be explained in part by the assumption that as time passes and farmers reallocate resources presently employed on their farms in a more efficient manner, the productivity per unit of capital employed will be improved.

Capital inputs will continue to play a major role in the internal organization of Iowa farms. Established farmers will find it necessary to find sources of additional credit. Young men beginning farming will face the problem of finding initial financing sufficient to meet the demands of an industry (agriculture) which has rapidly become mechanized and is rapidly becoming automated.

As shown in figure 19 and table 4, the farm labor force was smaller in each county in Iowa in 1960 than it was in 1940. In 1940 there were 308,860 people in the farm labor force in Iowa. In 1960 there were 209,826 people in the farm labor force. During the 21 years studied, the size of the farm labor force declined by about 32% (about 98,800 people). If the farm labor force were to decrease at the same

percentage rate from 1961 to 1980 as it did from 1940 to 1960 there would be about 142,680 people in the farm labor force in Iowa in 1980, a decrease of 67,146 people during the period.

There has been a very marked decline in the proportion of hired laborers in the farm labor force in the 1940 to 1960 period. In several counties, the decline in the number of hired workers was 50% or more during the period studied. As mechanization and automation progresses in Iowa agriculture, the number of hired laborers may decrease even more. If the trend in the size of the hired labor force witnessed in the past continues during the period 1961 to 1980, a young man wishing to start farming will find increasing difficulty in following the process used by his elders. He will be faced with the difficult task of becoming an individual operator as the first step toward becoming an established, secure farm operator, rather than as was the case in the past beginning as a hired hand and progressing toward becoming an individual operator gradually.

About 1/3 of the counties in Iowa had fewer operators working off farms 100 or more days per year in 1959 than in 1940 (see figure 21). As the organization of Iowa agriculture is adjusted to bring returns to labor in agriculture into balance with returns to labor in non-agricultural employment, the number of farm operators working off farms 100 or more days per year will decrease. As adjustment in agriculture continues the number of operators working off farms will

include a larger proportion of young men who are beginning farmers.

The shift from purely tenant operated or purely owner operated to part tenant - part owner was very pronounced from 1940 to 1959. If this shift in tenure systems is extended into the future, the proportion of either tenant or owner operated farms will be considerably smaller than in 1959. Young men entering farming will in many cases enter as tenants, although some will enter farming as owners or part owner - part tenant operators.

One of the most difficult of all agricultural inputs to quantify is the management input. Realizing that cardinal measurement of the management input is difficult if not impossible, let us look at management input in an ordinal sense. Few would argue that farmers in Iowa in 1959 needed to consider and analyse the interrelationships between many more parameters than farmers in earlier times. The trend in the capital investment has required increased skill in financial matters, increased acreage operated by improved or new machines required a comprehensive knowledge of rotation planning, price estimation and machine maintenance and operation.

Management inputs will continue to be of major importance in Iowa agriculture. The skill and training required to perform the complex management tasks points to the need for continued support of educational programs designed to help



train better farmers. Further consideration of the various topics relating to the proper educational plan or system is far beyond the scope of this study. It is sufficient to say at this point that currently the complexities of decision making on a competitive Iowa farm necessitates extensive training and experience in managing a farm business.

In summary it may be said that if the past is any indication of the future with respect to the structure and organization of Iowa agriculture there will:

1. continue to be opportunities for 1/3 or less of the young men in agriculture to become farm operators in Iowa.
2. be fewer and larger farms in Iowa.
3. be an increase in capital inputs but at a lower rate than in the past.
4. be fewer people employed in agriculture in Iowa.
5. be an urgent need to educate a large percentage of young farm people for non-farm employment.
6. be a continuing need for educational programs aimed at preparing young men to operate a farm business in a progressively more complex and competitive environment.
7. be a continued need for a program designed to keep practicing farmers informed and updated in their knowledge as changes occur over time.

## SUMMARY

The first appearance of the United States farm problem as defined in this study was in the late 1920's. Abnormal demands for food generated by the second World War remedied the major difficulties faced by agriculture until the late 1940's and early 1950's. There have been numerous governmental programs enacted by Congress aimed specifically at helping the agricultural sector of the economy.

Generally the governmental agricultural programs have been based on the assumption that the farm problem is a price problem and that compensation programs would facilitate the most effective remedy. It is difficult to say exactly what the effects of the various governmental programs for agriculture have been, but it is known that many farmers are still having serious difficulty obtaining satisfactory income levels.

It was shown that aggregate agricultural output increased noticeably in the 20 years from 1940 to 1959. The period studied was from 1940 to 1959 and in a few cases, 1960. The increased productivity of resources employed in agriculture has necessitated shifts in resource allocation. In recent years the marginal value productivity of capital has increased greatly and consequently more and more capital items are being used in agriculture. Increased use of machines of all types has meant that the size of the farm labor force could and should be reduced to maintain efficient operations. During

the period 1940 to 1959 labor employed in agriculture earned considerably lower returns than labor employed in non-agricultural industries. This is not meant to imply that they have simply given up and not tried to adjust to changing conditions. As a matter of fact, farmers in Iowa as well as across the nation have made many drastic changes in the basic organization of their farms. It is with the changes that have taken place in Iowa agriculture that this study was concerned.

Because of inadequacies in the available data in certain areas and the complete lack of data in others an exact analysis of all the details of the changes in the structure and organization of Iowa farms was not possible. It was possible, however, to get a general idea of the changes which have taken place in Iowa agriculture during the past 20 years from data collected by the United States Census Bureau and other individual research workers.

In 1940 there were 213,318 farms in Iowa. By 1959 only 174,707 farms remained (a decrease of 18.1%). A drop in the number of farms was observed in every county in the state. A very large proportion of the decrease in the number of farms in operation in Iowa from 1940 to 1959 actually took place during the last five years of that period, 1954 to 1959. The rate of decrease in the number of farms continued from 1940 to 1959 at an increasing rate as shown in table 5.

Polk county had a larger decrease in the number of farms

(1213 farms) than any other county in Iowa during the period studied. Lyon county in northwestern Iowa had three farms fewer in 1959 than in 1940. In general, there was a smaller percentage decrease in the number of farms from 1940 to 1959 in northwestern Iowa than in the rest of the state.

Although the trend for the state in general with respect to farm size has been toward fewer and larger farms, eight counties actually showed increases in the number of farms of under 10 acres from 1940 to 1958. It is interesting to note that for the most part those counties that experienced increases in farms of less than 10 acres were located in northwest Iowa. All of the other counties in Iowa had fewer farms of under 10 acres in 1959 than 1940.

The reasons for an increase in the less than 10 acre classification in a few counties are probably more social than economic. As many farmers reach retirement age they remain on the farm but rent out most of the land keeping only a few acres for themselves. As farmers seek off-farm employment they often reduce their acreage but maintain residence on the farm to enjoy the aesthetic values of country living.

Most Iowa counties had fewer farms under 100 acres in 1959 than in 1940. Farms of 100 acres or less, unless very highly specialized, haven't been able to yield adequate incomes in recent years. As one might expect, many of these small farmers either left farming or acquired additional acreage. Although they have tended to be larger in recent

years than they were in 1940, there has not been much change in the number of farms in Iowa of 1,000 acres or more. The acreage classification that exhibited the most growth from 1940 to 1959 was the 260 to 499 acre group.

The average Iowa farm had an acreage of 160.1 acres in 1940. By 1954 only 16.5 additional acres had been added to the average farm. From 1954 to 1959 the average farm size grew by 17 acres. In 1959 the average acreage of Iowa farms was 193.6 acres. The various counties of the state showed a wide dispersion in the increase in average farm size. To illustrate, the average farm size in Polk county increased 52.6 acres (from 101.8 to 154.4 acres) from 1940 to 1959. During the same period Lyon county in northwest Iowa lost only three farms. As a result the average farm size in Lyon county changed very little from 1940 to 1959. Average farm size increased much more in southern Iowa than the rest of the state during the study period.

A significant shift in the dominant type of tenure system occurred from 1940 to 1959. In 1940 most farms were either tenant operated or operated by owner operators. By 1959 the tenant class had become smaller as had the owner operator group. Large increases were observed in the number of farm operators operating farms on a part owner - part tenant basis. As tenant farmers accumulated capital over time they purchased land. Those farmers who had been operating as owner operators in 1940 tended to expand their operations by renting additional

acres. The number of farms operated by managers has decreased noticeably since 1940. The fact that the tenant class has become smaller in recent years means that many young men will enter farms as owner operators or as part owner - part tenant operators.

Related to, and in many cases directly causing the general organizational changes on Iowa farms were changes in resource use on Iowa farms. The major resources used on Iowa farms are, of course, land, labor, capital and management.

The total land base in Iowa has been quite stable over the years 1940 to 1959. The value of land, reported as value of land and buildings, has increased noticeably. In 1959 the average value of land and buildings was \$254.34 per acre. That was \$175.55 per acre more than in 1940. Every county in Iowa experienced increases in the value of land and buildings during the period studied. Land values doubled in most and even tripled in some counties from 1940 to 1959.

Labor employed in agriculture was much different in 1960 than in 1940. The size of the labor force was much smaller in 1960 (209,826 people) than in 1940 (308,660 people.) There were fewer hired farm laborers working 150 or more days in 1960 than in 1940. The average age of Iowa farmers increased during the same period. Many factors have influenced the size of the labor force in agriculture. The development of industrial complexes in certain areas of the state has provided alternative non-farm employment opportunities for

rural people. In many cases, however, there has not been adequate information available as to the nature and availability of alternative types of employment. As a result, farmers have not been eager to leave their farms and move to urban areas.

About 1/3 of the counties in Iowa had fewer farm operators working off farms 100 or more days in 1959 than in 1940. It became necessary for many farmers to take non-farm jobs to supplement the incomes earned from farming activities. Farmers can be found working part time in filling stations, elevators, as custodians in schools or as salesmen of various products and services.

The increase in durable capital items, power items, machinery items and breeding stock has been phenomenal in recent years. In 1940 there was \$809,377,000 invested in durable capital items on Iowa farms. By 1960 this figure has risen to \$1,319,621,000 (in constant 1947 to 1949 dollars). Throughout the period, beginning in 1940, there has been increased use of machinery and power items in all parts of the state. However, the increase in the use of power and machinery items was larger in the southern part of the state than in the northern areas. The number of breeding animals has decreased in the north central and northwestern parts of Iowa as farms shifted to various types of feeding operations. Farms in southern and northeastern Iowa increased their investment in breeding stock from 1940 to 1960.

In general the changes in durable capital inputs were larger in southern Iowa than in northern Iowa from 1940 to 1960. This is explained in part by the fact that much mechanization had taken place in northern Iowa by 1940 while southern Iowa farmers were still using animal power.

If the trends in the various characteristics of Iowa farms which were observed in the 20 years from 1940 to 1959 were to continue in the future, some very interesting phenomena would occur. The number of farms hence the number of operator opportunities would decrease in the next few years.

If the decrease in the number of operator opportunities followed a pattern in the future similar to that which was observed from 1940 to 1959, there were about 2,057 farms available in Iowa in 1961 for young farmers. There were about 2,482 young men seeking farming opportunities in 1961 based on population data. By 1964, if the trends of the past continue, there will be 158,983 farms in Iowa, 2,154 farm operator opportunities for young men and about 2,349 young men planning to start farming. From these figures it appears that the disparity between the number of those planning to farm and the number of opportunities will decrease in the future.

If the trend in average farm size observed from 1940 to 1959 continues, the average farm size in Iowa in 1979 will be about 234.2 acres. A farm business of the magnitude implied by an acreage of this size requires a large and efficient



management input.

While the amount of capital items employed on Iowa farms increased greatly from 1940 to 1960, it is very doubtful that the increase in the use of capital items will be as large in the next few years as it was in the period studied. In fact it seems highly probable that the 1960 product of Iowa agriculture could have been obtained with less capital than was actually used.

It is probable that if the farm labor force decreases as much in the period 1960 to 1980 as it did from 1940 to 1960 that the farm labor force in Iowa would be only 142,680 people as compared with 209,826 in 1960. There would be fewer hired laborers in 1980 than there were in 1960.

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