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Types of Farming in Michigan

Michigan State University Agricultural Experiment Station

Special Bulletin

E.B. Hill, F. T. Riddell, Agricultural Experiment Station; F. F. Elliott, Bureau of Agricultural Economics, USDA

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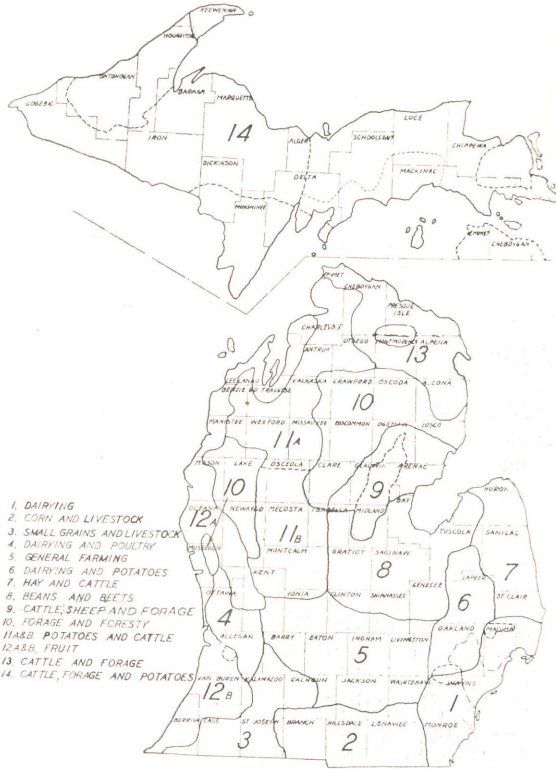
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E. B. Hill, F. T. Riddell, and F. F. Elliott



Agricultural Experiment Station
MICHIGAN STATE COLLEGE
 of Agriculture and Applied Science
 cooperating with the
 Bureau of Agricultural Economics
UNITED STATES DEPARTMENT OF AGRICULTURE

East Lansing, Michigan

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E. B. Hill, F. T. Riddell, and F. F. Elliott**

INTRODUCTION

This bulletin is written with the view of presenting a cross-section picture of certain farm management phases of the agriculture of Michigan. It is intended to provide a background of information essential to a clearer understanding of the prevailing organization of the farms, the location of the different type of farming areas and the factors influencing each of these. A wide variation in soil type, topography, climate, and economic conditions is found within the state. Because of these factors, Michigan farmers have found it advantageous to follow types of farming which may vary widely within rather short distances. An understanding of the nature and extent of these variations is essential before research and extension agencies can properly appraise the difficulties and needs of farmers in local areas, or before recommendations of a specific nature can be made with any reasonable degree of assurance of their applicability.

Methods are presented which indicate how special tabulations of census data may be used to supplement the usual agricultural census data in arriving at the important types of farming in the state and in determining the typical farming systems for different sizes of farms in each area. Illustrations are also given to show how these typical farming systems may be used in conjunction with production and price information in testing out and appraising the profitableness of different types of farms. Long time and year to year adjustments in different farming systems may also be tested.

In this study the state is divided into 14 different type-of-farming areas, as shown on the front cover. A type-of-farming area is a region where the majority of farms have similar crop and livestock organizations, and are operated under similar physical and economic conditions. There is a high degree of uniformity in the kinds and amounts of crop and livestock enterprises, in the farm practices followed, and in the methods of disposal of products. The availability of markets, transportation facilities, soil types, climate and topography are generally comparable throughout an area. It should be remembered that the divisions between the different areas is not always as definite as the boundary lines would indicate, and that the transition from one area to another is gradual. There is some overlapping of types in some of the areas. In

*Special acknowledgment is made to Verne H. Church, Agricultural Statistician, Bureau of Agricultural Economics, U. S. Department of Agriculture, J. O. Veatch, in charge of Soil Survey work, and O. Ulrey, Economics Department, Michigan State College of Agriculture, and to D. A. Seeley, Meteorologist and Section Director, U. S. Weather Bureau, East Lansing.

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most cases, however, differences are found within the range of one or two townships.

In a map of the size used in this bulletin, it is obviously impractical to show in greater detail the local variations in types of farming due to local differences in topography, soil type, and market conditions. For example, most every area has comparatively small acreages which are devoted to truck and fruit crops but which are not typical of the entire area. The fruit region in the west side of the state has many large areas where certain kinds of fruit predominate; for example, grapes, peaches, and apples in the south and apples and cherries in the north. Again, in relatively fertile regions, some inferior land is found, and then in some poor or marginal regions some land is usually found which is relatively fertile and well suited to a different type of agriculture than that prevailing in the region.

FACTORS DETERMINING THE CROP AND LIVESTOCK ENTERPRISES

The factors determining the crop and livestock enterprises are physical, economic, biological, and personal in nature. For the most part, the determining factors are the physical and economic conditions. The physical factors determine the products which can be produced in a given area, while the economic factors determine the products which are produced. Biological factors which relate to insect pests, diseases, and animal pests are of importance in some regions. Personal preference of the farmer is usually a minor factor affecting the type of agriculture of an area, although it is important in determining the organization of an individual farm. Before discussing the agriculture within the type-of-farming areas, information relative to the physical and economic factors prevailing over the state is presented. The effects of these factors within each area are discussed in a latter part of the bulletin.

Physical Factors

The physical factors are climate, soils, and topography. Climate includes such items as: (1) length of the growing season, (2) maximum and minimum temperature during the year and the growing season, (3) distribution and amount of rainfall and humidity, (4) dates of killing frosts, (5) intensity of sunshine and degree of cloudiness, (6) snowfall, and (7) winds and storms, and direction of the prevailing winds. Michigan's climate is influenced much by differences in latitude, variations in elevation and by the surrounding Great Lakes. Soils include such factors as: (1) fertility, (2) drainage, (3) texture, and (4) acidity. Topography or contour of the land is important in so far as it affects the air drainage, water drainage, soil erosion, soil temperature and the size of farm machinery which can be used efficiently.

Farmers have no control over climate and topography. The drainage, fertility, acidity, and texture of the soil can be modified on many farms.

A few farmers can supplement the natural rainfall by irrigation. Farmers, before purchasing or renting farms should consider the climate, soil and topography and in so far as is possible select a location which most nearly meets their desires. After the farm has been selected, however, they must adapt their farming to the existing conditions.

Climate*

The weather elements which most vitally effect the selection and production of crop and livestock enterprises are temperature, rainfall, and sunshine; while other conditions such as humidity, wind velocity, and wind direction also play a more or less important role. Any one of these conditions may be a limiting factor in crop production. Michigan

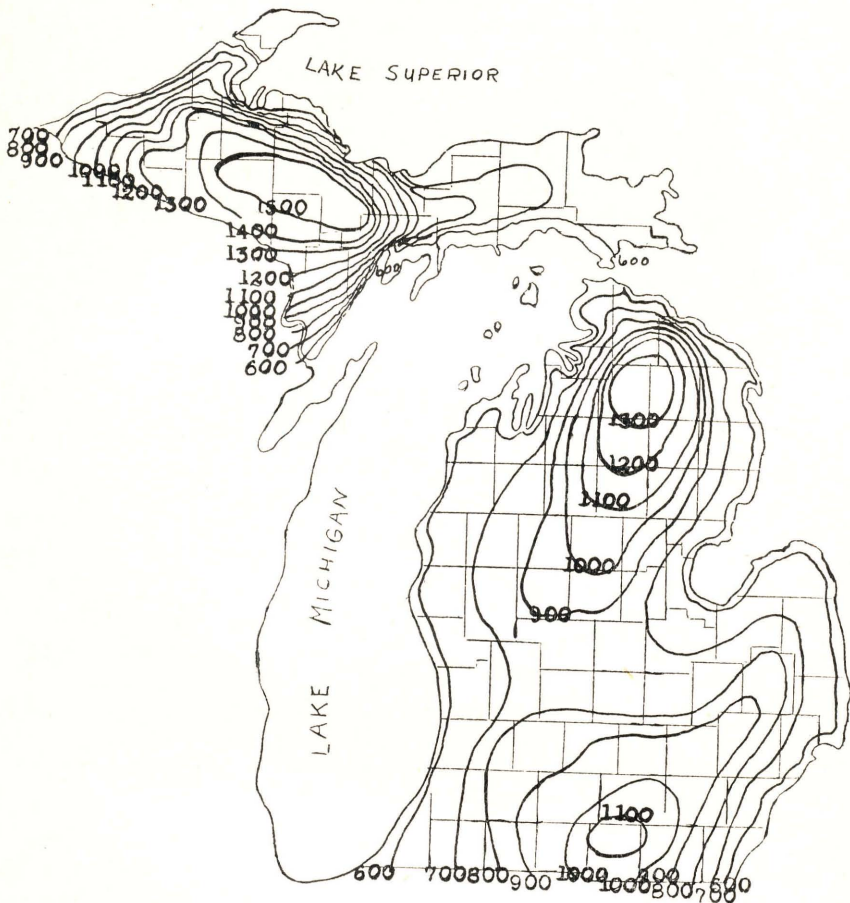


Fig. 1.—Elevation of Michigan in feet above the sea level. Land in the higher elevations tends to have a cooler temperature and a shorter growing season.

has a great range of climatic conditions which play an important part in determining the different type-of-farming areas. The state has limited areas, such as the Fruit Area 12, in which climatic conditions are entirely different from those only a few miles away. These differences in normal climatic conditions make it possible to grow certain crops successfully in one section which could not be grown profitably in another.

There are three main reasons for the fact that Michigan has regions of

*Written by Dewey A. Seeley, Meteorologist and Section Director, U. S. Weather Bureau, East Lansing, Michigan.

distinct climatic characteristics. These are, the surrounding Great Lakes, the variation in latitude, and the variation in elevation (Fig. 1). Of these three, the influence of the Lakes and the variation in latitude are more pronounced and important. Lake Michigan is especially marked in its influence as it tempers both extremes in temperature, preventing extremely high temperatures during the summer and extremely low temperatures during the winter.

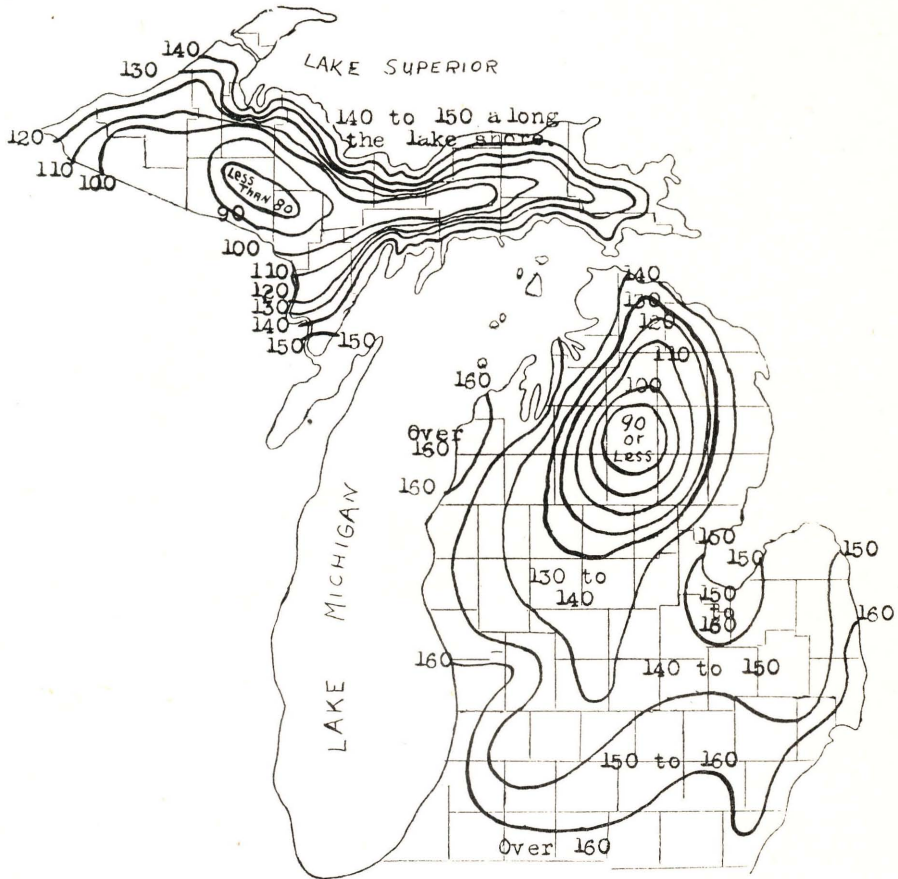


Fig. 2.—Average number of days in the growing season, from last killing frost in spring to first killing frost in autumn. The length of the growing season is affected by Lake Michigan, the direction of the prevailing winds, the elevation, and the latitude.

It delays fall frosts, prevents frost damage in the spring and increases the humidity during the growing season. The influence of Lake Michigan makes possible the fruit area along the western shore of the state. This large body of water after being warmed by the summer sun, retains its heat during the autumn. In October and November, the temperature of the lake water is often 15 to 20 degrees higher than the surface soil temperature along the shore. Cold west and northwest winds, which

sweep into the lake region from the Dakotas and western Canada are greatly tempered in passing over this wide stretch of warm water and reach the shore of Michigan warmer than before crossing the lake. Thermometer readings on the west shore of Michigan average 10 degrees or more higher during the fall and winter than those across the lake in Wisconsin. As a result, the autumns are long and mild, and hence favor-

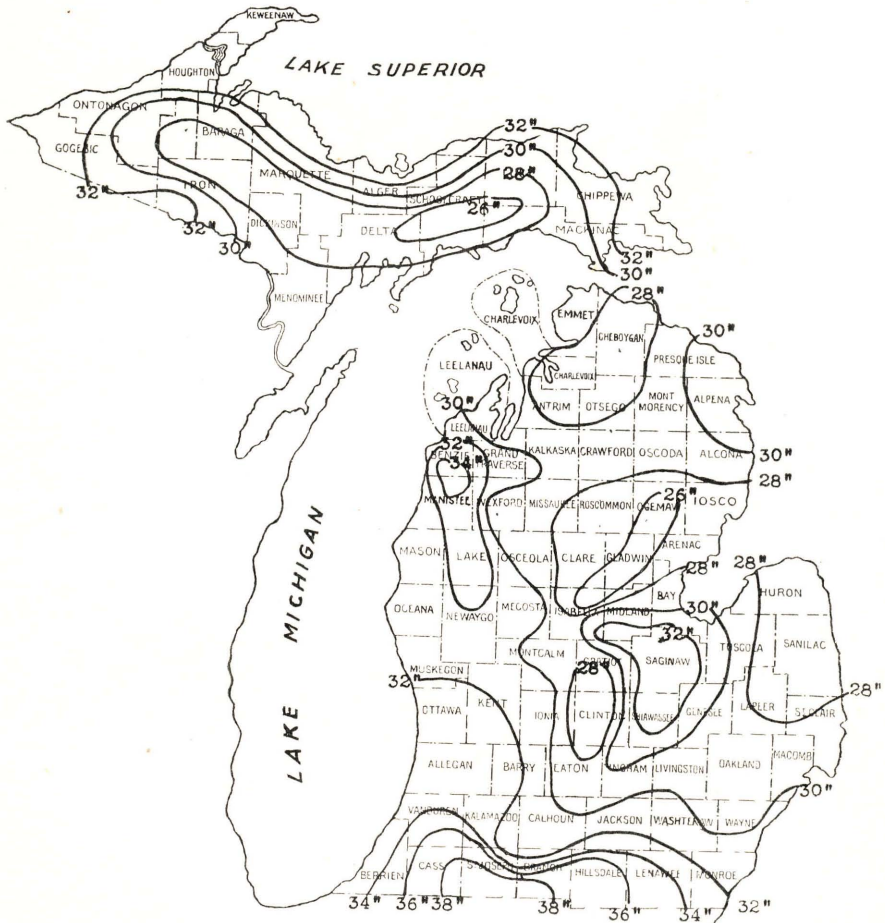


Fig. 3.—Average annual precipitation in inches for Michigan. The amount and distribution of the rainfall during the year influence the crops produced.

able for ripening fruit and hardening new growth on fruit trees, thus lessening winter killing. Summer temperatures along the shore are much more moderate than those across the lake or in the interior of the state.

After the water in the Great Lakes is finally cooled during the winter, it remains cold until late in the spring or early summer, thus retarding too rapid growth of vegetation in the spring and delaying the opening of fruit buds until danger of frost is past. It often happens that damage from frost, not only to fruit but to other crops, occurs generally over the

state except near the Lake Michigan shore where little or no injury results.

The growing season is much longer along the Lake Michigan shore than it is inland, as shown by Fig. 2. As this chart indicates, the growing season inland is 20 to 50 days shorter than it is along the lake because of the greater distance from the Lake and the higher elevation. With many crops, this extra growing time means the difference between success and failure. This lake influence is much less pronounced on the Lake Huron shore because the prevailing winds in the Great Lakes region are from the west and consequently do not carry the lake temperature inland on the eastern side. Lake Superior influences the weather along the northern shore of the Upper Peninsula but does not modify the climate along the shore line as does Lake Michigan, because of the northern latitude.

Elevation influences the climate of some sections of the state to a considerable degree. In the north-central portion of the Lower Peninsula, where elevations are 500 to 1000 feet greater than they are over most of the state, the weather is extremely cold in winter and the growing season comparatively short. (Fig. 1).

The rainfall in Michigan averages about 31 inches per year. As shown in Fig. 3, this rainfall is not evenly distributed over the state but ranges from less than 26 inches in the driest sections to more than 38 inches in the wettest places. The Thumb district and the center of the Upper Peninsula have the least rainfall, and a few counties along the Indiana border have the heaviest precipitation. A more important consideration than the annual precipitation is the normal rainfall during the growing season. Fortunately, in Michigan, as indicated by Fig. 4, the months of May, June, and July have the heaviest rainfall throughout the Lower Peninsula. These copious rains especially in the central and southern counties, together with less rainfall in the harvest season of autumn, approach ideal conditions most years. However, droughts sometimes limit production and heavy rains in the fall occasionally cause serious loss to such crops as beans during the harvest season. Areas in which droughts occur occasionally are limited and their location varies from year to year so that no one section is affected many seasons in succession.

The variation in the amount of sunshine in different parts of the state is largely influenced by the bordering lakes, especially Lake Michigan. In the late fall and early winter, the western portion of the Lower Peninsula has less sunshine than practically any other section of the country. The lake water at that season is warmer than the adjoining land. The prevailing westerly winds are warmed and moistened in passing over the lake and when they strike the colder land areas the moisture is condensed and the resulting clouds are very persistent, obscuring the sun for days at a time. Just the opposite conditions prevail in summer, however, and there is less cloudiness and more sunshine in western Michigan than in surrounding states. Fortunately, sunshine is more needed just at this season by the growing crops and this greater amount of sunshine in summer is probably another reason why the growing of first quality, finely flavored fruit is so successfully carried on in the fruit belt.

In a state which extends as far north and south as Michigan, the length of time from sunrise to sunset during the growing season is considerably

different between the northern and southern extremes of the state. From the northern tip of Keweenaw Peninsula to the Indiana and Ohio border is a range of six degrees in latitude, which means that in the summer season the sun is above the horizon three-quarters of an hour longer each day in the extreme northern part of the state. This extra amount of sunshine is an important factor in crop growth in north-sections of the state.

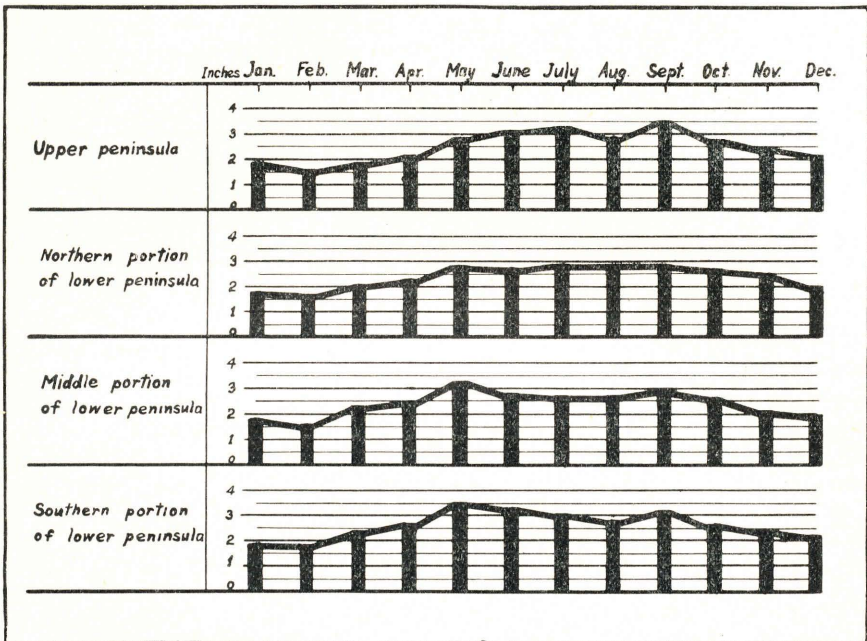


Fig. 4.—Distribution of precipitation by months in the different sections of the state. The state is fortunate in securing a larger portion of the precipitation during the crop-growing season.

Lake Michigan is also beneficial in lessening such phenomena as hail and tornadoes. These storms are less frequent in Michigan than in surrounding states, as the cool water of the lakes tends to check their development. However, the southern half of the Lower Peninsula occasionally suffers from hail and sleet injuries to fruit and other trees.

Thus, climate is very important in determining the type of farming and the crops grown in the different sections of the state. The crops most affected are fruit, vegetables, corn, beans, sugar beets, and alfalfa seed.

Soils, Topography, and Natural Divisions of Land*

Soil is one of the essential elements in the classification of land and in determining the type of farming to be followed. The terms soil and land are not synonymous as might be inferred from common usage. The term land is used in an agricultural sense which involves value and use

*Written by J. O. Veatch, Soils Section, Michigan Agricultural Experiment Station.

of the plant growth, yields under natural conditions and the capacity to produce crops under cultivation. The intrinsic nature of the soil, the nature of the soil association which includes both uniformity and the complexity of soil types, the nature of the topography and drainage, the cover of vegetation, the geographic location and human activities all affect the classification and use of land.

The fact of greatest significance, aside from natural fertility in terms of plant nutrients, in the study of the soils of Michigan is the diversity of soils and their complex association in small bodies. The state possesses soils which range in texture from plastic, compact clays to sands which are shifted by wind action. There is also a wide range in humus and nitrogen content between the dark colored soils and the gray soils which contain such a thin humus layer even in their virgin condition that it is scarcely measurable. There is a wide range in the content of the essential elements of nutrition such as phosphorus and potassium. The lime content also varies widely and the soil reaction varies from very strongly acid to alkaline. The moisture may be low, and the soil droughty or the soil may hold excessive amounts of water. Soils may be penetrable to depths of several feet and free from stones or they may be thin, impenetrable, and excessively stony. In addition to the mineral soils, there is a large aggregate acreage of organic soil, peat and muck, which also ranges in physical and chemical nature from the raw highly acid peat of water-covered bogs and marshes to the black, loamy, well decomposed, fertile mucks of hardwood swamps.

The soils in Michigan do not occur generally as uniform individual types in bodies of large extent except on some of the sandy pine plains in the central and northern parts of the state. They occur more commonly in small bodies and in associations comprising a number of types which not only differ chemically and physically, but also exhibit diversified topography and drainage. It frequently happens that this natural variability is accentuated because the system by which public lands were sub-divided involved the establishment of straight north-south and east-west lines which were more likely to cross and to ignore than to follow natural boundaries of soil types.

The major combinations of soil and topography which have been influential in determining the present use of land and types of farming are as follows:

1. Uniformly smooth or level land with fertile, durable soils dominant, but in combination with smaller bodies of less fertile but arable land. Such land can be laid out in large rectangular fields, and larger machinery units can be used advantageously.
2. Arable, level soils associated in small areas with hills and slopes. The soils vary distinctly in fertility, moisture content, and crop adaptations.
3. Uniformly level land with good drainage, but the soil is of low fertility and excessively dry.
4. Uniform mineral soil dotted with peat depressions and lakes, or peat and muck swamps dotted with ridges and hills of mineral soils.
5. Fertile soils which are non-arable because of excessive stoniness, steepness of slope, or poor drainage.
6. Arable rolling land with gentle or moderately steep slopes contain-

ing a dominant amount of productive loams, but with small bodies of inferior soil.

7. Medium fertile, uniform soils lying in level dry plains.

8. Complex associations of wet and dry soils which are dominantly low in productivity. The land is smooth or has slight surface variations alternating in narrow strips.

9. Hills or dunes of deep infertile sands subject to shifting by the winds.

These nine natural combinations of soil and topography have been largely instrumental in determining whether the land could be used for cultivated crops, grazing, forestry or recreational purposes. Where land is used for farming, these conditions have been factors in determining the kind of crop and livestock enterprises produced, the size of farms, the size and shape of fields, the need for drainage or irrigation, the utilization of larger machinery units and in general the type of farming to be adopted.

The geographic distribution of the above conditions is presented in the following description and accompanying maps.

NATURAL DIVISIONS OF LAND

Soil types and the natural land divisions of the state do not happen to conform in their distribution to the boundaries of the political units, such as counties, nor to establish geologic and physiographic divisions except in the most general way. The natural land divisions have not, heretofore, been defined and named and geographic names are consequently not available for convenience of description. Therefore, in the following descriptions, the Roman numerals applied to each division on the accompanying map are used as a matter of expediency. Figures 5 and 6 show the outlines and extent of the natural divisions of land in Michigan.

Lower Peninsula

Division I. The soils of this division are dominantly loams, silt loams, and clay loams in the plow layers, which are underlain by clay. They are relatively high in organic matter and nitrogen, high in lime, retentive, relatively fertile, and durable under cultivation. However, small bodies of sands and sandy loams, both wet and dry, ranging in fertility and productiveness from low to relatively high, are intimately associated with the characteristic heavy soils.

The surface of the land is generally level or smooth, but may have low swells and narrow ridges. The aggregate amount of steep broken land and of excessively stony land is almost negligible while muck and peat constitute less than 5 per cent of the total area. The principal limiting factor is the naturally poor drainage. With adequate artificial drainage provided, the climate and soil favor the growing of special cash crops, and general farming supplemented with dairying or stock feeding. This division is mainly first class land but a part is second class, and a very small aggregate of marsh, peat swamp, sand and broken land is third class.

Division II. The soil which characterizes this division is mainly silt loam, or loam. It is deep, medium to relatively high in fertility, and

durable under cultivation, except on the steeper slopes. Sands and sandy loams which are medium in fertility are intimately associated with the heavier soils and constitute 30 to 40 per cent of the total area. Peat and muck, widely distributed both in small and large bodies, constitute 10 to 15 per cent of the division.

The surface includes nearly level or gently rolling land with smooth slopes, small areas of hilly and choppy topography, and flat, wet, and swamp land, in both large and small bodies.

The characteristic soils are the Miami, Isabella, Conover, Brookston, and Napanee types. These are suitable for the growing of the staple crops, as hay, corn, oats, wheat, beans, alfalfa, and beets. The association of diverse soils in small bodies, including muck and peat, and the lack of uniformity in topography is a determining and limiting condition to the type of farming, size of farms, and size and shape of fields. Conditions generally favor diversified, moderately intensive farming although, specialized farming on mucks and mineral soils is profitable in local areas.

Division III. The soils which occupy the largest aggregate acreage and lend character to the division as a whole are sandy loams, and sands. They are moderately retentive to excessively pervious and droughty, generally strongly acid in the surface layers, low to medium in organic matter, medium in fertility, in part subject to water and wind erosion, and only moderately durable under cultivation. Small bodies of clay soils similar to those in Division II are associated with the dominant sandy soils, while muck and peat, in large or in small bodies, constitute 15 to 20 per cent of the total area. The principal soil types are the Hillsdale, Bellefontaine, Coloma, Fox, Plainfield, Miami, and Conover.

The topography ranges from gently rolling and hilly with steep slopes to level plains. Both the hills and the plains are featured by lakes, dry depressions, swamps, marshes, and bogs. The complex association of diverse soils and surface features is unfavorable for large farms and extensive farming. Small areas are sub-marginal for farming and are best suited for recreational purposes due to the hilly or choppy topography, and the combinations of woodland, swamp, marsh, and lakes.

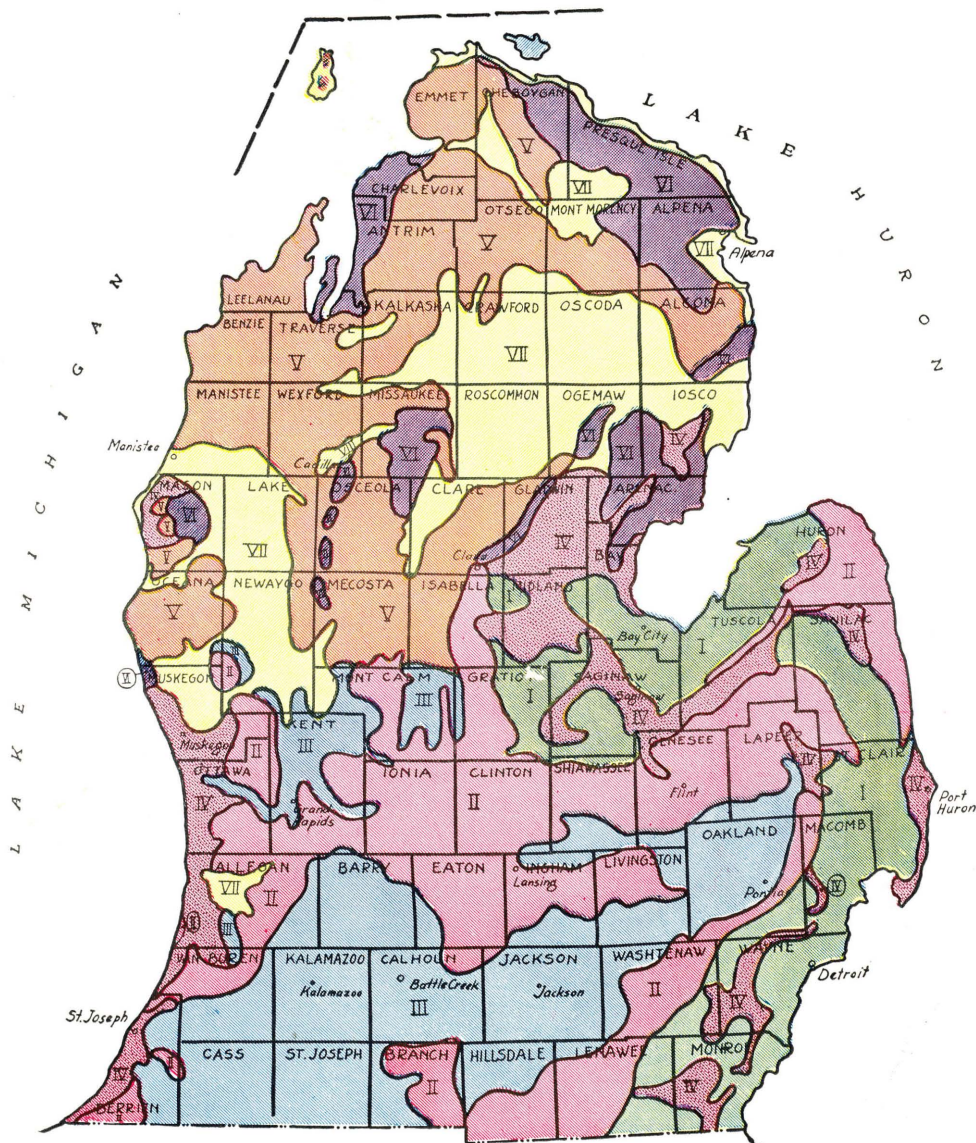
However, conditions are favorable for larger farms and larger fields on some of the level plains but, in such locations, low or medium fertility coupled with deficiency in moisture are unfavorable conditions. The favorable factors in general are ease of tillage, responsiveness to fertilization, and adaptability to a great variety of crops. Conditions are especially favorable for both intensive and extensive fruit growing on the land adjacent to Lake Michigan. In the division as a whole the land is lower in rank than that of Division II, but locally a large aggregate is first class.

Division IV. The soils of the division are mainly sands and sandy loams, both dry and wet, both acid and alkaline, and range in fertility from high to low. A small aggregate of clay soils, the same as in Division I are included.

The surface is generally level or flat but, in places, includes low ridges and hummocks. The smooth topography, easy tillage, and responsiveness to fertilizers are favorable factors. The land is adapted to special truck and fruit crops where the climate is favorable and to a less extent to general farm crops. By virtue of location and intensive farming some

FIG 5—GENERALIZED SOIL AND LAND MAP OF THE LOWER PENINSULA OF MICHIGAN

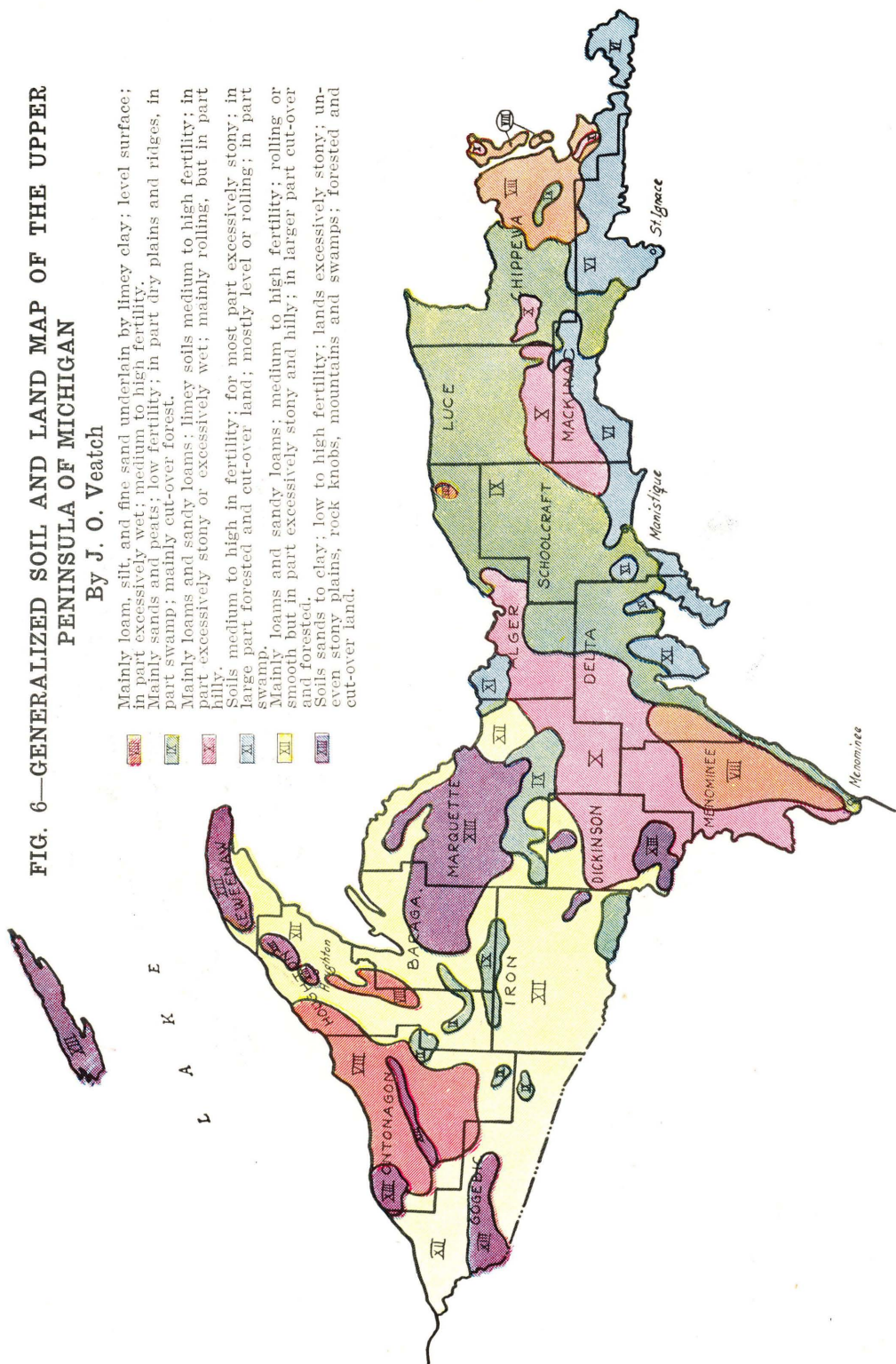
By J. O. Veatch



- I Mainly dark colored fertile clay soils; level surface.
- II Mainly loams and sandy loams; medium to high fertility; rolling surface; well drained but retentive soils.
- III Mainly light colored sandy loams and sands; medium to low fertility; hills and level plains; high percentage of muck swamp included.
- IV Mainly sands and sandy loams; medium to low fertility; level surface.
- V Mainly light colored sandy loams and sands; medium to low fertility; well drained; hilly to level surface; in part forested and cut-over land, in part stony.
- VI Mainly loams and sandy loams underlain by clay; medium to high fertility; level to hilly surface; in part stony.
- VII Mainly sands; low fertility; droughty; mainly level plains, but in part hilly; mainly cut-over and second growth forest.

FIG. 6—GENERALIZED SOIL AND LAND MAP OF THE UPPER PENINSULA OF MICHIGAN

By J. O. Veatch



of the land is first class, but larger amounts remain second and third class.

Division V. The soils which characterize this area are mostly sands and sandy loams which are medium in fertility. There is a range from moderately retentive soils to those excessively dry, from stone free to excessively stony, and from moderately acid and low in lime to those exhibiting a strong limestone influence. Smaller areas of well drained and poorly drained clay soils are associated with the dominant sandy soils. Peat and muck in small separate bodies and in extensive valley swamps constitute about 10 per cent of the area as a whole.

The land is partly rolling to hilly and partly relatively dry sandy plains. The favorable conditions from an agricultural point of view are ease of tillage, responsiveness to fertilization, adaptation to a diversity of crops, and, for that part lying directly along Lake Michigan, suitable for fruit production. Much of the hilly land is only medium in fertility, subject to wind and water erosion, and unfavorably located for the extensive cultivation of staple crops. The level sandy land is mostly only medium in fertility and is deficient in moisture. All of the upland was originally forest, consisting mainly of white pine, Norway pine, and hemlock. A large percentage remains either as stump pasture land, cut-over and second growth forest, or virgin hardwood and swamp timber.

The land for the most part is considered as second class with a large percentage marginal and sub-marginal for farming, but certain local areas are first class land suited to the production of special crops as potatoes and fruit, due to especially favorable soil and climatic conditions.

Division VI. The characteristic soils in Antrim, Charlevoix, and Grand Traverse counties are the Onaway types which are loams and sandy loams, underlain by clay, high in lime, retentive, relatively high in fertility, and durable under cultivation except on the steepest slopes. The topography consists of hills and short parallel ridges with valleys and depressions containing swamps and lakes. A small part of the land has excessively steep slopes, a part is moderately stony, and a part is very diverse in soil and topography. As a whole, the land is relatively first and second class and is adapted to general farming and to special crops such as seeds, potatoes, and fruits.

In Alpena, Presque Isle, and Cheboygan counties, a large percentage of the land is nearly level, but the soils are excessively stony and, in places, limestone bed rock lies at a depth of a few inches to a few feet. In addition, gently rolling and hilly land and soil similar to that of the northwestern counties is found, together with level land underlain by plastic, reddish clay. A part of this soil is wet, swampy, and expensive to reclaim but is durable, fertile, and adapted to hay and small grain. A large part of the land is second class and marginal because of its disadvantages of location, excessive stoniness, and unfavorable combinations of soil and topography. Some of the land in this section has a rank of first class where it is most favorably located and highly improved.

The separate areas elsewhere included in this Division comprise clay soils of medium to relatively high fertility, level and poorly drained or moderately rolling, and generally stone free or not excessively stony. The land as a whole is relatively first and second class and is more suitable for hay, small grains, and dairying than the associated sandy soils but a considerable part has the disadvantages of a northern interior loca-

tion, poor drainage, cut-over or forested condition, or swamp and sands. It is inferior to similar soil types in the southern part of the state.

Division VII. The soils of this division are mainly sands and sandy loams underlain by pervious sandy drifts to depths of several feet. They are acid, low in lime, low in organic matter, low in moisture, and low in fertility. The surface is mainly level plains but sandy hill land is also included. Swamps and lakes are present but constitute on the whole less of the total area than in other divisions.

The limiting factors are low fertility, low moisture, tendency of soil to blow when tilled, and unfavorable northern location. The soil originally supported pine forests or mixed pine, oaks, and other hardwoods. The land remains largely in a wild, cut-over condition.

Under the most favorable conditions of location, as in the more southern areas, farming may be practicable for special crops where the soil is highly manured and fertilized. Under present economic conditions, the greater part is regarded as third class land or sub-marginal for farming and is best adapted to forestry and recreational purposes. Land lying directly along the shore of Lake Huron is included in this division although it is by no means as uniformly dry sand as the other areas.

Upper Peninsula

Division VIII. The characteristic soils of this division are loams, silt loams, clay loams, and sandy loams underlain by reddish, highly plastic, impervious, high-lime clays and silts. The generally flat or level land surface is featured by poorly drained areas and by swamps. In some places, low swells and narrow ridges or hummocks of sand are broken by narrow trenches cut by streams. The soil is relatively fertile, durable, and is adapted to hay, small grain, root crops, dairying and grazing. Uncleared land is occupied by pine and hardwood stumps, a dense second growth of aspen, and remnants of the original mixed conifer-hardwood forest. Compared with similar soil and topography in the southern part of the state, the land here has a disadvantage in location and has greater limitations due to the lower mean temperature. This division contains relatively first class land. The difficulties in tillage and drainage are objectionable features. Associated with the characteristic clay land, there are small bodies of both wet and dry sands, gravelly beach ridges, sandy hills, stony flats, and peat and muck swamp, which are second and third class land adapted only to forestry, game refuges, and parks.

Division IX. The dominant soils of this division are sands which are low in organic matter and fertility in the surface layers, low in moisture, and low in lime content to depths of three feet or more. The topographic features are level dry plains, low hills and low narrow ridges, slightly rolling land representing both old and recent dunes, and numerous lakes. Associated with the dry sands, there is, in places, an extensive aggregate of peat swamps which occur in large bodies and contain islands of sand. The peat swamps also occur in small bodies interspersed through the higher land.

The lands were forested originally for the most part with Norway, white and jack pine, and some hardwoods. The swamps were occupied mostly by a dense growth of spruce, cedar, and tamarack. Open marsh and bog also constituted a considerable aggregate acreage. The land for the most part now exists in a wild cut-over state or in virgin forest.

The limiting factors at present are unfavorable location, low fertility of the soils and the presence of numerous swamps. The division as a whole is regarded as third class or non-agricultural land. It affords only second class grazing and is most valuable for forestry purposes, game refuges and recreational uses. Small areas of well drained sandy loams, sands and also wet clay lands are included which are sub-marginal at present but are potential farm land.

Division X. The dominant soils are sandy loams and sands, which are well drained but underlain by clay or clayey sands which retain moisture, and sandy loams underlain by heavier clay. The sandy soils are mostly medium in fertility, and the fertility of the heavier soils is medium to relatively high. The sandy land contains nearly level plains, or plateaus, and moderately hilly land. Part of the clay land is hilly or rolling and is interspersed with swamps and part is nearly level and poorly drained. A considerable part of the soil of this division is moderately fertile and durable and is first class land. Other parts are productive but have the disadvantages of either excessive stoniness, steep slopes, or a complex association of small bodies of the better land and the poorer land and are therefore second class and marginal. Some of the land, consisting of swamps, dry sands on hills and plains, stony terraces, gravelly and bouldery knobs and ridges, is third class and suitable for only non-agricultural uses.

Division XI. The presence of bed rock at shallow depths, and stones and huge boulders scattered over the level surface are characteristic of this division. The bed rock is generally limestone except in Alger and Marquette counties along Lake Superior, where sandstone is the underlying rock. The finer soil material presents a range from loose, nearly pure sand to plastic clay, and from low to high fertility. The topography is nearly level. This division contains a considerable aggregate of wet lands which are mainly peat and muck swamp.

Small areas are in gardens and cleared pastures but the greater part of this division is third class or non-agricultural land under existing conditions of unfavorable location, excessive stoniness, mixture of wet and dry soils, and wild cut-over condition.

Division XII. This division comprises a wide range in soils and a diversity of topographic and drainage conditions. The characteristic soils are loams and slit loams, which are medium to high in fertility, but generally stony. The topography varies from nearly level to hilly with excessively steep slopes. Swamp land and lakes are common. The soils exhibit little or no limestone influence. They show heavier texture and a redder color in the surface layers than the soils of the eastern part of Division X, particularly in the cases of soils derived from the sandier drift. The greater part of the land also lies at higher elevations.

The division as a whole is ranked as second class land but it includes small local areas which are relatively first class, and a considerable aggregate which has no present value for the production of staple cultivated crops. The limiting factors are unfavorable location, high altitude and short growing season for a large part of the area, stoniness, and cut-over or forested condition of the land. The fertility and productivity of the soil is not inferior, however, and locally, good yields and high quality hay, oats, barley and potatoes are produced. Much of the land is capable of affording good pasturage.

Division XIII. This division is characterized by high knobs or mountainous country thinly covered with soil or glacial drift, areas of stony, bouldery land, barren rock out-crop, and a confusion of hills, dry valleys, swamps and lakes. Small patches of land here and there are arable and fertile, but the greater part is non-arable and third class or sub-marginal because of excessive stoniness, high elevation, and diversity of soils and drainage conditions. Its chief value is for forestry and recreational purposes.

Economic Factors

The economic factors which affect the farm organization and the type of farming within a state are: (1) relationship of prices and costs, (2) market demand, (3) transportation, (4) competing areas, (5) cycles in supply, (6) price of land (7) supply of capital, (8) period of investment, (9) labor supply, and (10) relationship of competing and supplementary enterprises.

The relationship between prices and costs is affected by all of the other economic factors listed above. Prices refer to the cash receipts from crop and livestock products which farmers sell. Expenses such as wages, fertilizers, taxes, seeds, interest, equipment and building repairs represent items of costs which farmers pay. In order to secure a profit from an enterprise a farmer must have a balance after he sells the product and has paid all of the expenses. The profit, or difference between prices and costs affects the choice of a man's vocation, the selection of the community for his farm, the selection of enterprises on his farm, and the relative amounts of the different farm enterprises.

Market demand considers the number of available consumers in the area of distribution, and the changes in the tastes or desires of the consumers. The farmers of Michigan have near-by markets for large amounts of their farm products. The great development in manufacturing and the attendant increase in city population has increased the size of the market for the Michigan farmer. The consumption of the different products changes from day to day, season to season, and year to year. The consumption of dairy products, poultry products, fruits, and vegetables has been increasing more rapidly than population. The increase in city population and the consequent increase in demand has stimulated the production of these products in different sections of the state.

Transportation includes the costs and facilities for transporting the farm products to the market, the distance to the market and the time required to transport the products from the farm to the market. The condition of the roads, the distance to the shipping point, the freight, express, or truck rates, the railroad and storage facilities, and the directness between the shipping point and the consuming center may stimulate or discourage the production of certain farm crops in each area.

Competing areas affect farming in specific areas through quality and quantity of production, production costs, and marketing costs. Some areas have more favorable climate and soil than others, and will consequently receive a higher price for the superior quality of product produced. The size of the areas adaptable to the production of a specific product will affect the quantity produced and consequently the price. Production costs vary from field to field, and from year to year on the same farm, and from one area to another the same and different years.

The greatest profits are made on farms and in areas of lowest production costs, since competition tends to keep farm prices near the average cost of production and the high-cost farms and the high-cost areas have little or no profits above production costs. Differences in transportation costs, handling charges, and other marketing costs will give some areas advantages over others. The lowering of production costs through such changes as increasing the size of the farm business, and the use of large scale machinery will result in an advantage to the area or farm where such production cost is reduced. For example, farmers on hilly land which is not adapted to the use of the harvester-thresher and other large scale machinery cannot lower their costs to successfully compete in the crops involved with farmers whose production costs are lower on relative level and fertile land. Reduction in freight rates, or other marketing expenses will tend to give the farmers whose freight rates and marketing costs are lowered an advantage over the farmers whose freight rates or marketing costs are not lowered.

The cycles and seasonal changes in the supply or quantity of a product results in cyclical and seasonal changes in prices. A low price for a farm crop will reduce production as farmers will reduce the acreage of the low-priced crop. The reduction in acreage results in a lower total production if the yields do not change. This lower total production brings a higher price and consequently stimulates farmers to increase their acreage. Thus, we have a cycle in prices associated with a change in production. Farm prices also change during the year due to the seasonableness of production and the variation in consumer demand during the year. These seasonal and cyclical changes in prices affect the type of farming within an area when farmers adjust their farm organizations because of these price changes.

The price of the land will affect the enterprises and type of farming within an area. The more intensive enterprises are found on the higher-priced land, because only the farmers who follow intensive systems of farming can earn sufficient to pay for the land possessing a favorable physical and economic environment. Extensive systems of farming do not earn sufficient profits to exist on high-priced land. For example, a beef cattle breeding enterprise is not profitable on fertile land in an area surrounding a good fluid milk market. Some land may be so high in price, because of its real estate value, that all agricultural enterprises are unprofitable. Forests and pastures are produced on the cheap lands, while the more intensive farm enterprises are found on the higher-priced agricultural lands.

The amount of capital possessed by a farmer and the available supply of capital for loaning purposes on good terms affect the size of the farm business and the enterprises selected. More capital is needed for profitable livestock and fruit farming than for truck, grain, and cash crop farming.

The period of investment is also longer in case of fruit and livestock farming than for truck, grain and cash crop farming. The period of investment is so long in case of timber growing that private individuals do not care to plant timber.

The labor supply includes the quantity and quality of available farm workers, their training for farm work, and the wages necessary to hire them. High industrial wages raise farm wages and force farmers to

economize on labor by using more machinery and by efficient farm management. High farm wages tend to stimulate an extensive type of farming, and discourage an intensive type. An increase in the supply of laborers tends to reduce the wages and permit farmers to follow a more intensive system of farming. The training and experience of available farm workers may effect the type of farming which can be carried on in a community.

The crop and livestock enterprises on a farm may be competitive, supplementary or complementary. Enterprises are said to be competitive when they compete for a farmer's resources, such as his labor or the use of his equipment. For instance, oats and barley require labor at the same time for planting and harvesting, consequently they compete with each other for a place in the organization of the farm. Supplementary enterprises are those which do not compete for the factors of production. Enterprises demanding labor or the use of equipment at different seasons of the year are supplementary in nature. A good example of such enterprises is provided in corn and winter wheat. The enterprises on a farm are complementary when they are mutually interdependent or beneficial to each other. The combination of crops that provide feed either as the main product or by-product, with livestock needing such feed are examples of this relationship. A complementary relation exists between legumes and the succeeding crops that profit from the increase in fertility. The proper selection of enterprises based upon their competitive, supplementary or complementary relationship, and the balancing of the size and proportion of each enterprise is essential for maximum utilization of the farmer's resources and realization of the greatest profit.

Biological Factors

The biological factors affecting the crops and livestock enterprises and the type of farming are: (1) the insect pests, (2) diseases, and (3) animal pests. For the most part the agriculture of the state is rather uniformly affected by most of these factors and thus almost all farmers must consider them in their regular farming program. A study of the fruit, corn, and sheep enterprises of the state, however, serves to illustrate how the type of farming in an area has been or may be changed as a result of these biological factors.

In the earlier periods of Michigan's agriculture a higher percentage of the apple crop was produced in farm orchards. As the country became more settled and the farm orchards became more numerous, the damage from disease and insect pests increased until it became necessary to spray to produce a high quality fruit. This required special skill, expensive machinery and also required labor at a time when it was needed on the major field crops. As a result, most of the farm orchards were neglected and apple production has tended to concentrate as a major enterprise in the areas to which it is best adapted. The corn borer has given indications that it may become serious enough in the major corn area to cause some adjustments in the farming programs of that region. Dogs, occasionally make sheep raising a risky enterprise near large cities.

Most of the insects, diseases and animal pests are controllable by the farmer by spraying, by proper seed treatment, by varying the time of planting, by lengthening or changing the crop rotation and by following an accepted livestock sanitation program.

Personal Factors

The personal factors affecting the type of farming followed are: (1) the likes and dislikes of the farmer, (2) his training and experience, and (3) the customs of the neighborhood. For instance, a farmer that likes dairying will probably have more cows on his farm than one that does not, even though the physical and economic factors are the same. In many cases, the training and past experience of the individual farmer is very influential in determining the kind and amount of the various crop and livestock enterprises on his farm. The customs of a farmer's parents and his neighbors also have much to do with the selection and development of enterprises. The difference between profit and loss, often depends upon whether a farmer changes his enterprises and methods to meet new physical and economic conditions or follows the customs of his ancestors and neighbors. These personal factors affect the organization of individual farms, but exert much less influence upon the type of farming of an area than the physical and economic factors. A farmer who likes a specific type of farming should locate in an economic and physical environment which favors that type of farming, or he should change his likes to conform to the type of farming favored by the economic and physical factors of his environment.

This discussion of the physical, economic, biological, and personal factors affecting the selection of enterprises and the type of farming is followed by a discussion of the utilization of land in Michigan, the distribution of crop and livestock enterprises, and the typical farming systems in the different types of farming areas.

LAND UTILIZATION IN MICHIGAN

In studying the important type of farming areas in Michigan, it is desirable to acquaint the reader with the general uses of the land and to indicate the sections in which the production of each crop and class of livestock is most important.

In 1924, about 49 per cent of the land area was classed as farm land and the remaining 51 per cent was in forests, cut-over land, and land in roads, cities, and streams. Crop land occupied 26.3 per cent and pasture 15.5 per cent of the total land area. A larger proportion of the land area was in farms in the southern third of the Lower Peninsula than in any other part of the state, Fig. 7. With the exception of Wayne county, the first five southern tiers of counties had from 61 to 94 per cent of their land area in farms. In the Upper Peninsula, there were small tracts of virgin timber and much cut-over land. Upper Peninsula counties showing the greatest agricultural development were Menominee, Houghton, Chippewa, and Delta with from 19 to 35 per cent of their land area in farms. In the other counties, the farm land occupied from 4 to 10 per cent of the land area.

The amount of improved farm land varies widely throughout the state due to the diversity of soil and climate conditions. Figure 8 shows the general distribution of crop land. Those sections having the largest proportion of their land area in farms also have the highest proportion of their farm land in crops and vice versa. However, there is an inverse relationship between the crop and pasture area as the portions of the

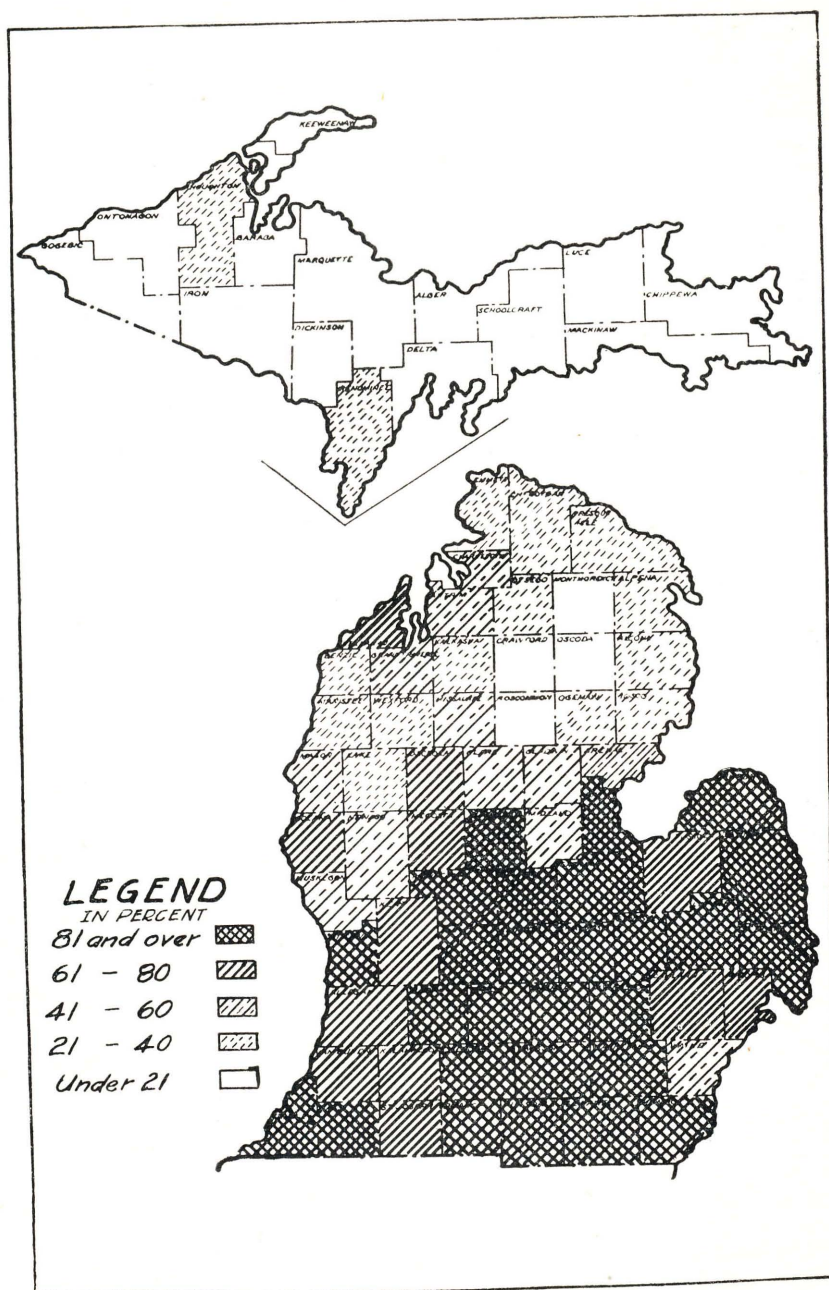


Fig. 7.—Per cent of land area in farms, 1924. The highest per cent of land area in farms is found in the lower six tiers of counties in Southern Michigan.

state having a large percentage of their farm area in pasture have a low percentage in crops and vice versa, Fig. 9.

DISTRIBUTION OF THE IMPORTANT CROPS

Michigan, because of its wide variety of soil types and to its great range in climate and accessibility to good markets, produces a large

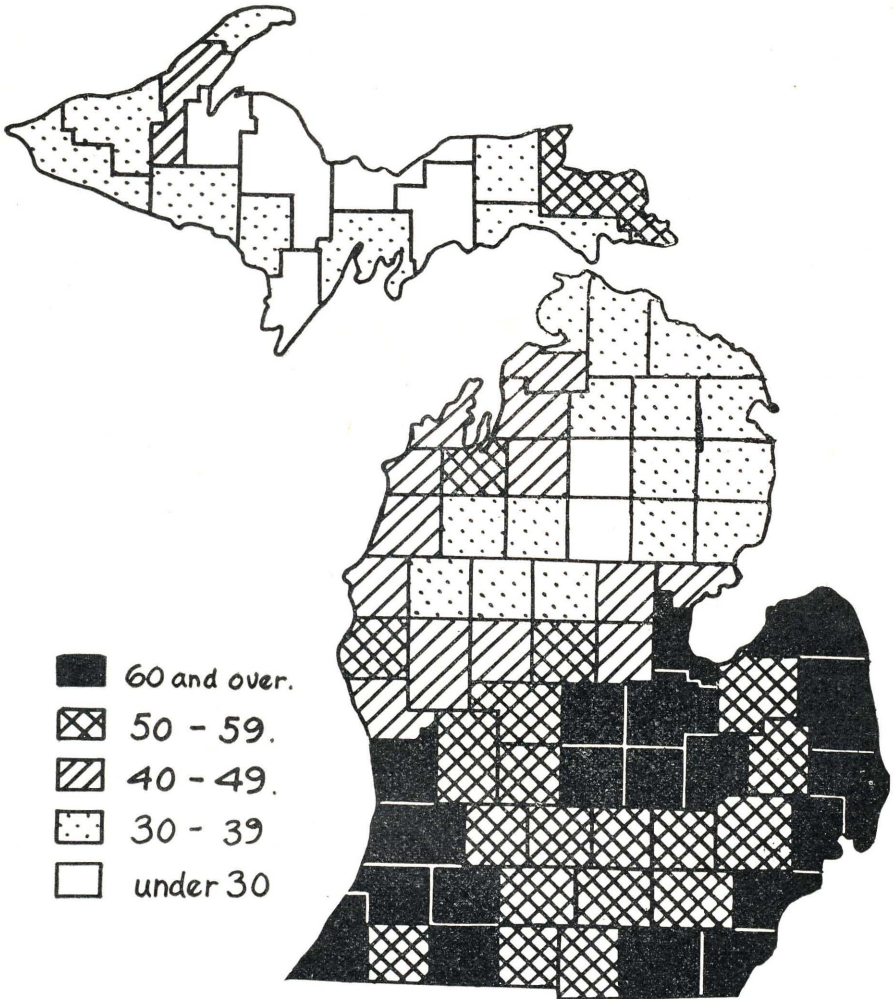


Fig. 8.—Per cent of farm land classed as crop land, 1924. The per cent of farm land classed as crop land is highest in the southern portion of Lower Michigan.

variety of crops and livestock. Some of these enterprises are found in all sections of the state, while others are localized in relatively small areas. For convenience of presentation the crops are divided into three classes, (1) feed crops, (2) cash crops, and (3) fruit and truck crops.

Feed Crops

The important feed crops, hay (including clover, alfalfa, alsike, and timothy), corn, oats, and barley, represented 69.3 per cent of the crop acres of the state for the five-year average, 1924-28, (Table 1).

The largest acreages of hay are found in the southern and eastern portion of the Lower Peninsula (Fig. 10). However, hay constitutes the

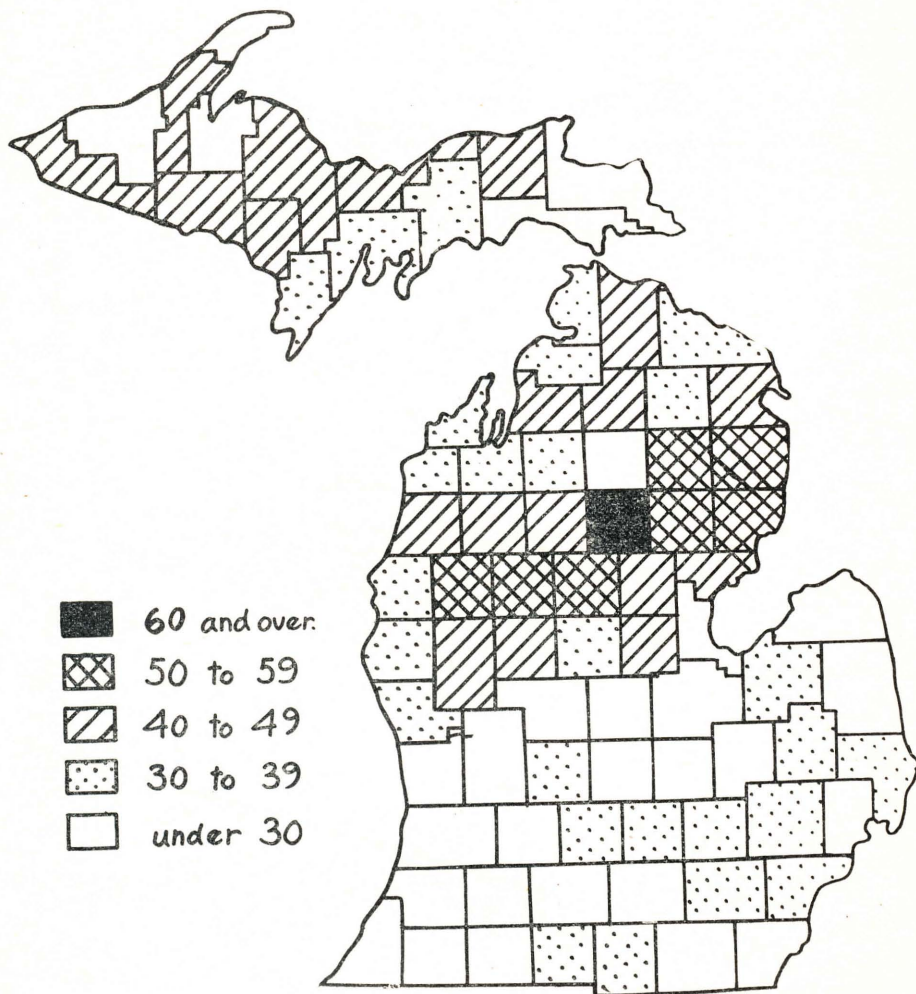


Fig. 9.—Per cent of farm land classed as pasture, 1924. More of the farm land is classed as pasture, and in addition some land not included in farms is pastured in the northern part of the Lower Peninsula and in the Upper Peninsula.

highest relative percentage of the total acres in crops in the northern part of the Lower Peninsula and in the Upper Peninsula. Since some type of hay is adaptable to the wide variety of climates and soils in

Michigan, and since hay is needed as feed in all areas, it is grown on practically all farms. The large acreage in the eastern side of the state is accounted for by the fact that considerable areas of the soil are level and poorly drained and the better adapted to the production of hay than of other crops. Alfalfa, which represented 23 per cent of the total hay tonnage in 1927, is most common in the southern tier of counties where the soil contains considerable lime (Fig. 11).

Table I.—Acreage, per cent of crop land occupied, production, and farm value of the important crops in Michigan for the five-year period, 1924-1928.

Crops	Acres 1924-1928 ¹ in thousands	Per cent of total acreage in crops, 1924-1928	Average annual production, 1924-1928 ¹ in thousands	Average annual farm value, 1924-1928 ¹ in thousands
Hay.....	2984	33.98	4,209 T.	\$53,237
Oats.....	1590	18.11	54,991 bu.	24,153
Corn.....	1345	15.32	51,171 bu.	42,707
Wheat.....	893	10.17	17,232 bu.	22,747
Beans.....	584	6.65	6,508 bu.	21,086
Tree fruit and grapes.....	307 ²	3.49	.....	12,679 ²
Apples.....	212 ²	2.41	6,746 bu. ³	6,712 ³
Grapes.....	29 ²	.33	55 T. ³	2,730 ³
Peaches.....	32 ²	.36	871 bu. ³	1,379 ³
Pears.....	12 ²	.14	694 bu. ³	755 ³
Cherries.....	14 ²	.16	.....	.....
Plums and apricots.....	8 ²	.09	.....	1,103 ³
Potatoes.....	268	3.05	29,403 bu.	24,472
Rye.....	198	2.25	2,700 bu.	2,429
Barley.....	167	1.90	4,742 bu.	3,437
Sugar beets.....	99	1.13	768 T.	5,763
Truck crops.....	81	.92	.....	6,713 ³
Clover seed.....	78	.89	113 bu.	1,739
Buckwheat.....	51	.58	715 bu.	609
Field peas.....	27	.31	475 bu.	522 ⁴
Small fruits.....	20	.23	.....	3,300 ³
Mint ⁴	15	.17	400 lbs.	1,100
Soybeans.....	11	.13	66 bu.	102 ³
Chicory ⁴	10	.11	50 T.	500
Other crops ⁴	20	.23	.....	.....
Farm gardens.....	12 ⁴	.14	.....	8,126 ³
Forest products on farms.....	.....	.....	.....	10,067 ³
Greenhouse products.....	.....	.....	.....	2,767 ³
Nursery products.....	.....	.....	.....	779 ³
Total.....	8784	100.00	.....	\$249,034

¹Michigan Crop Reports.

²1924 Census.

³Farm Value, Gross Income and Cash Income from Farm Products. Section I Crops, Bureau of Agricultural Economics, U. S. D. A.

⁴Estimated.

Most of the corn is grown in the southern half of the Lower Peninsula. The highest yields of corn are obtained in regions where the land is relatively level, where the soil is fertile, well drained, and retains moisture, where the growing season is hot, and where there is considerable rainfall during July and August. These conditions are best fulfilled in

Monroe, Lenawee, Hillsdale, Branch and adjoining counties. Most of the soils are too light, and most of the seasons are too cool for the best corn production in northern Michigan. In this section of the state, with the exception of small areas in the northwest portion of the Lower Peninsula and sections on the southern tip of the Upper Peninsula, the hot seasons are too short for successful corn production (Fig. 12). Corn is

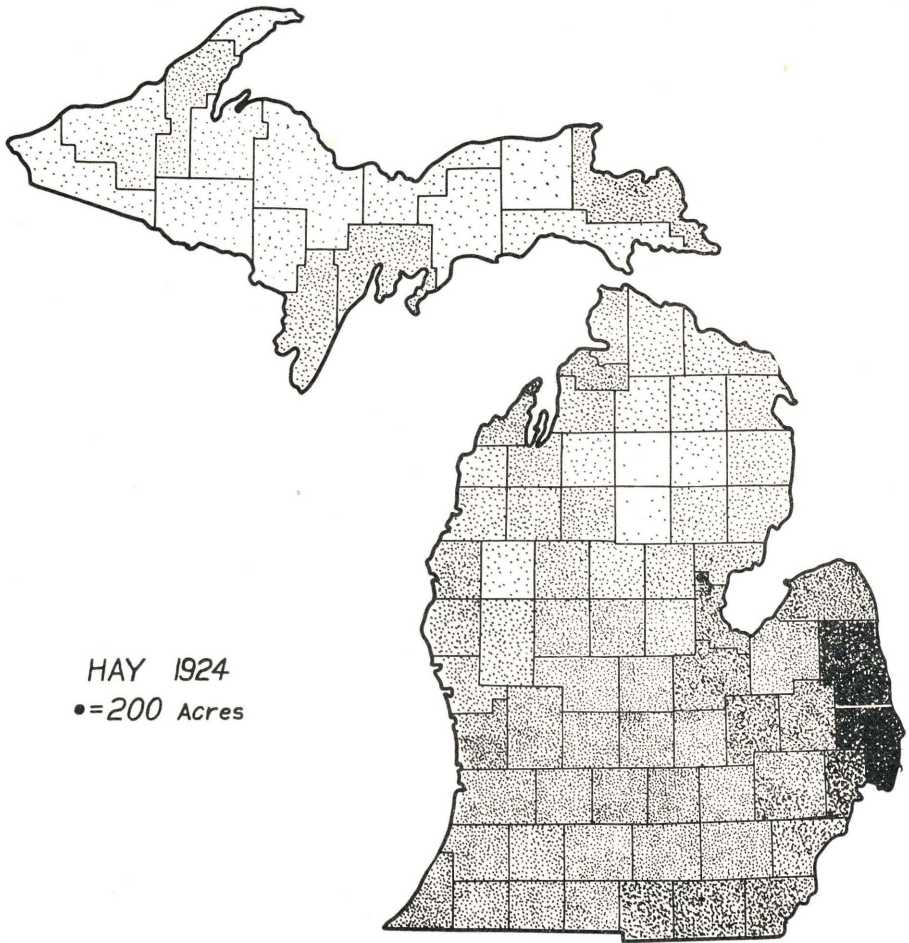


Fig. 10.—Distribution of the acreage of all hay in Michigan in 1924. Each dot represents 200 acres. Hay, with an average annual value of \$53,237,000 for the five-year period, 1924-1928, is Michigan's most valuable crop.

grown for silage and fodder in many sections of the state not adapted to the production of corn for grain.

Oats are grown in all parts of the state, although the heavy producing areas are in the southern half of the Lower Peninsula where most of the corn is produced (Fig. 13). Oats are best adapted to cool, moist regions and to fertile, moisture-holding loams, silt loams, and clay loams. The

best oat section is north of the Corn Belt where the weather is too cool and the season too short for the best yields of corn. The oat crop is not only adaptable to the fertile soils and cool climate of Michigan, but it is also well suited to the major crop rotations.

Barley is adapted to the heavier types of soils in all parts of Michigan. It is increasing in acreage as farmers come to understand barley produc-

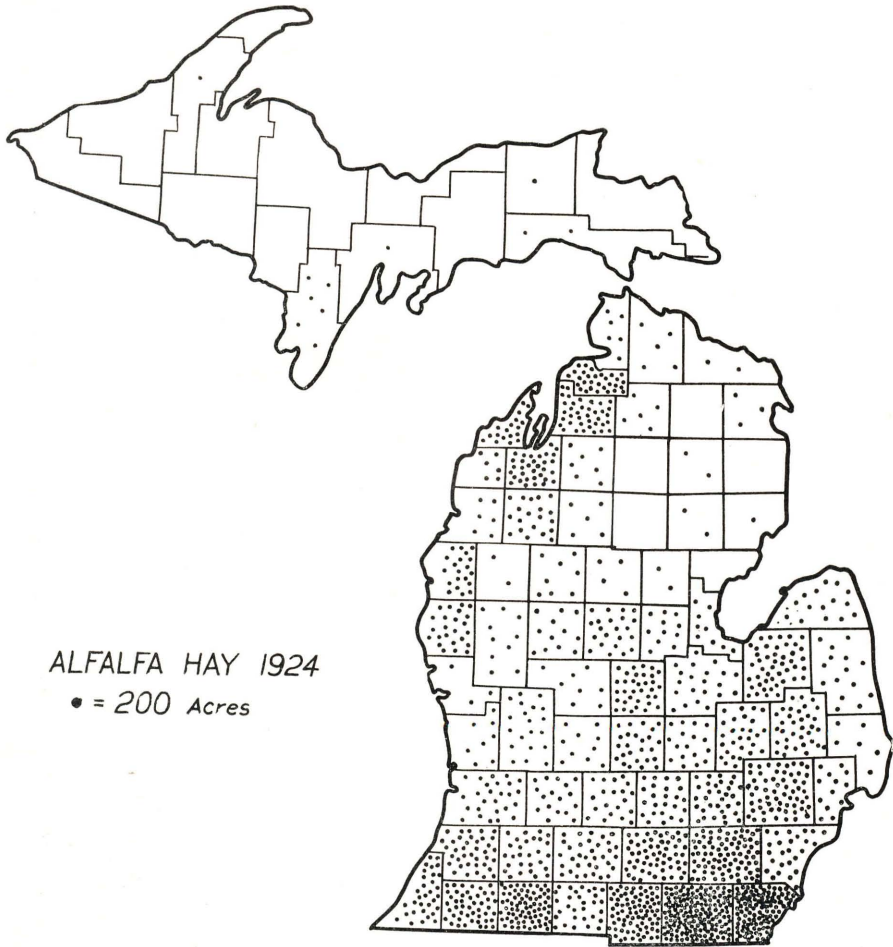


Fig. 11.—Distribution of the acreage of alfalfa in Michigan in 1924. Each dot represents 200 acres.

tion and feeding methods. It is adapted to the Corn Borer areas where the corn crop may suffer damage from the corn borer.

Cash Crops

The major field cash crops, soft winter wheat, beans, sugar beets, potatoes, and rye occupied 23.2 per cent of the total areas devoted to crops in the state for 1924-28 (Table 1).

Wheat, which ranks first in acreage of the field cash crops, occupies 10 per cent of the total crop acres of the state. Winter wheat is adapted to a great variety of soils, but the larger acreages are found in the southern half of the Lower Peninsula where it is less likely to be winter killed than farther north (Fig. 14). Wheat fits particularly well in the crop rotations on the fertile soils. In the 80's, the acreage of wheat in

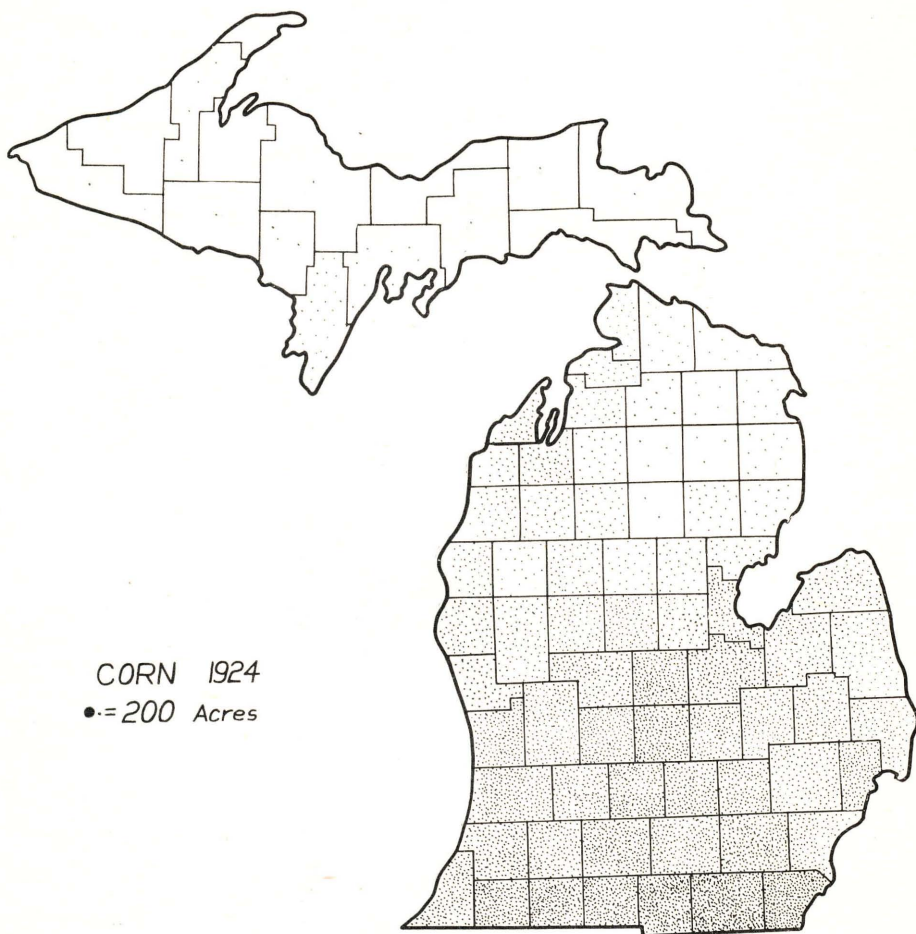


Fig. 12.—Distribution of the acreage of corn in Michigan in 1924. Each dot represents 200 acres. Corn, with an average annual value of \$42,707,000 for the five-year period, 1924-1928, is Michigan's second most valuable crop.

Michigan was twice that of the present time. Wheat has been gradually replaced by beans, sugar beets, and by feed crops as other lower-cost areas farther west have increased their production of wheat.

Beans are best adapted to the fertile loams, silt loams, and clay loam soils which are moisture-retentive, well drained, and well supplied with organic matter and the mineral elements of fertility, particularly calcium. Beans require a uniform growing season which is sufficiently long to

permit maturity before fall frosts, and which is characterized by cool nights, ample rainfall, and a high humidity. These conditions are best fulfilled in the Saginaw Valley, Thumb section, and in Area 5 (Fig 15). In these areas, navy beans are grown. Oceana and Newaygo counties in the western part of the state grow a considerable acreage of red kidney beans. Michigan is one of the most important bean-producing states, as it produces around 35 per cent of the total U. S. bean crop.

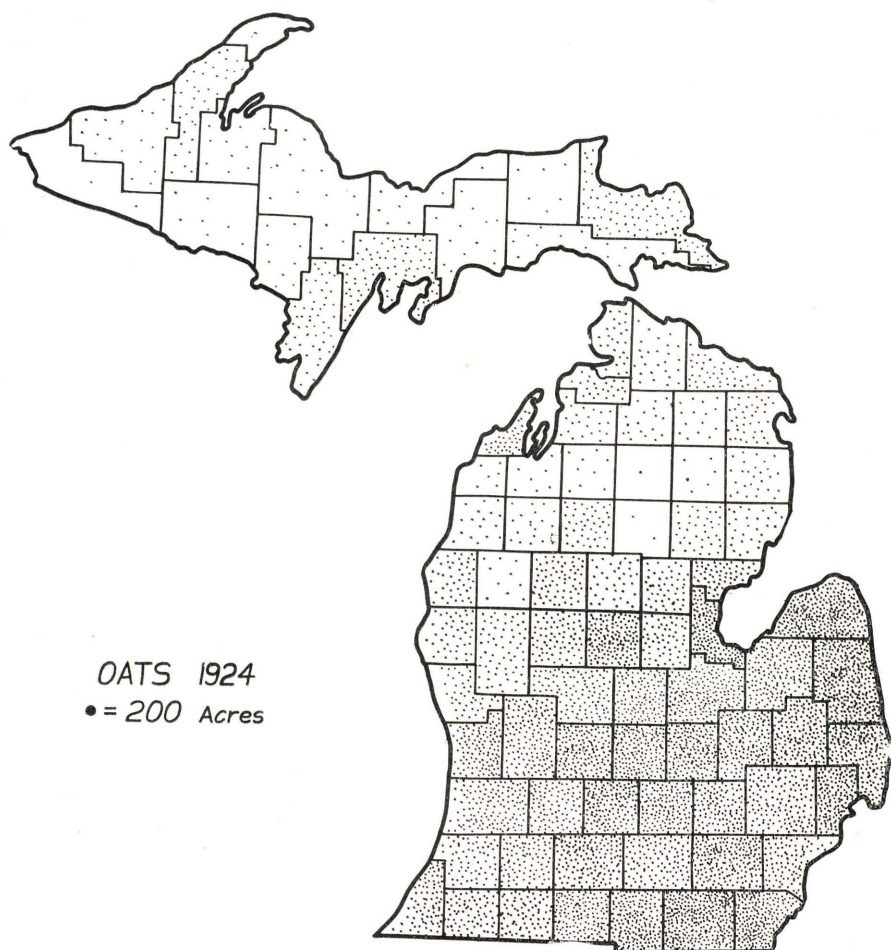


Fig. 13.—Distribution of the acreage of oats in Michigan in 1924. Each dot represents 200 acres. Oats, with an average annual value of \$24,153,000 for the five-year period, 1924-1928, is the fourth most valuable crop in the state.

Sugar beets are best adapted to regions of ample rainfall and a temperature sufficiently warm to give a large tonnage, but cool enough to give a high sugar content. They require fertile, relatively heavy, and well drained soils, such as loams, silt loams, and clay loams. These conditions are found in the most satisfactory combination in the Saginaw

Valley, the Thumb region, and in Lenawee and Monroe counties (Fig. 16). An available supply of hand labor is essential for blocking and thinning the sugar beet plants during the growing season.

Potatoes grow best on fertile sandy loams and loams which are high in organic matter and well drained. They will grow on acid soils. A cool, moist climate is essential. Potatoes are grown throughout the state but the commercial areas are located largely in Areas 6, 11, and the northern

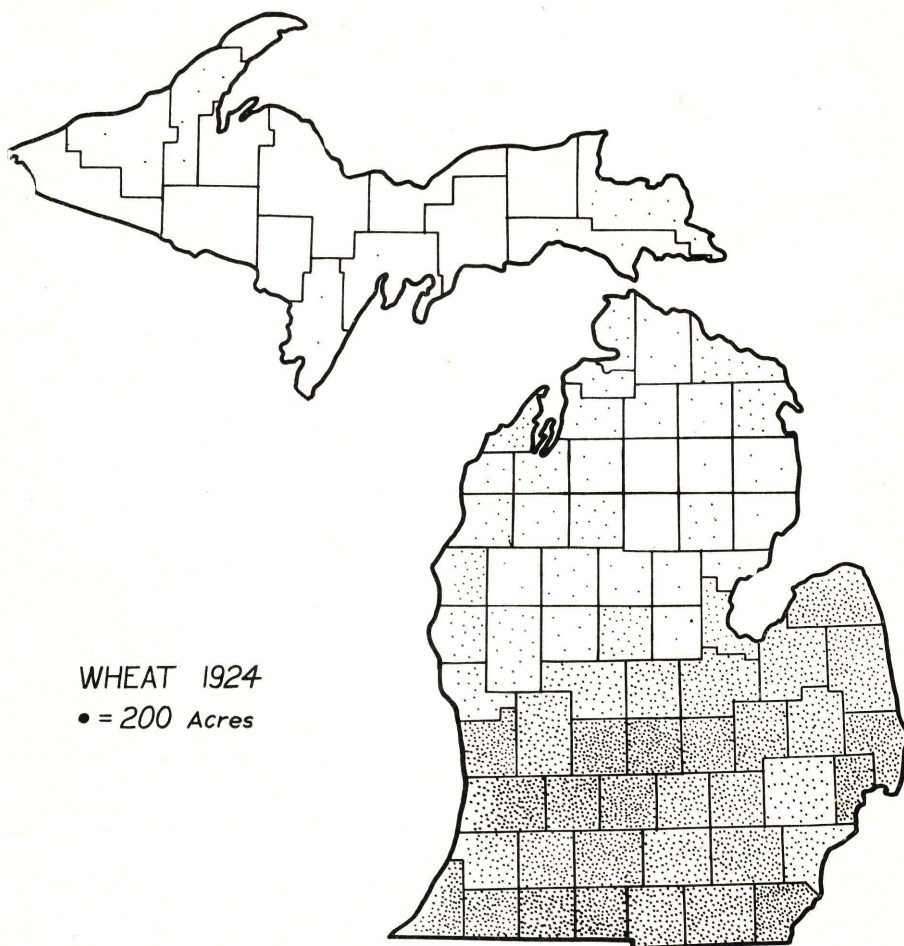


Fig. 14.—Distribution of the acreage of wheat in Michigan in 1924. Each dot represents 200 acres. Wheat, with an average annual value of \$22,747,000 for the five-year period, 1924-1928, ranks fifth in the value of all crops in the state.

portion of 12A (Fig. 17). Potatoes are also the important cash crop in the Upper Peninsula where they are well adapted to the friable, mellow soils and the cool, moist climate. The certified seed potatoes are produced chiefly in the northwestern part of the Lower Peninsula where high quality potatoes can be grown as a result of uniformly cool seasons,

and light soils which are usually slightly acid. The table stock areas are located farther south where the seasons and soil are less favorable for quality production and where the marketing costs are lower because of the shorter distance to markets.

Rye is grown on the lighter soils throughout most of the state. It is found chiefly, however, in the western and southern parts of the state. Rye is somewhat harder than winter wheat and can be planted later

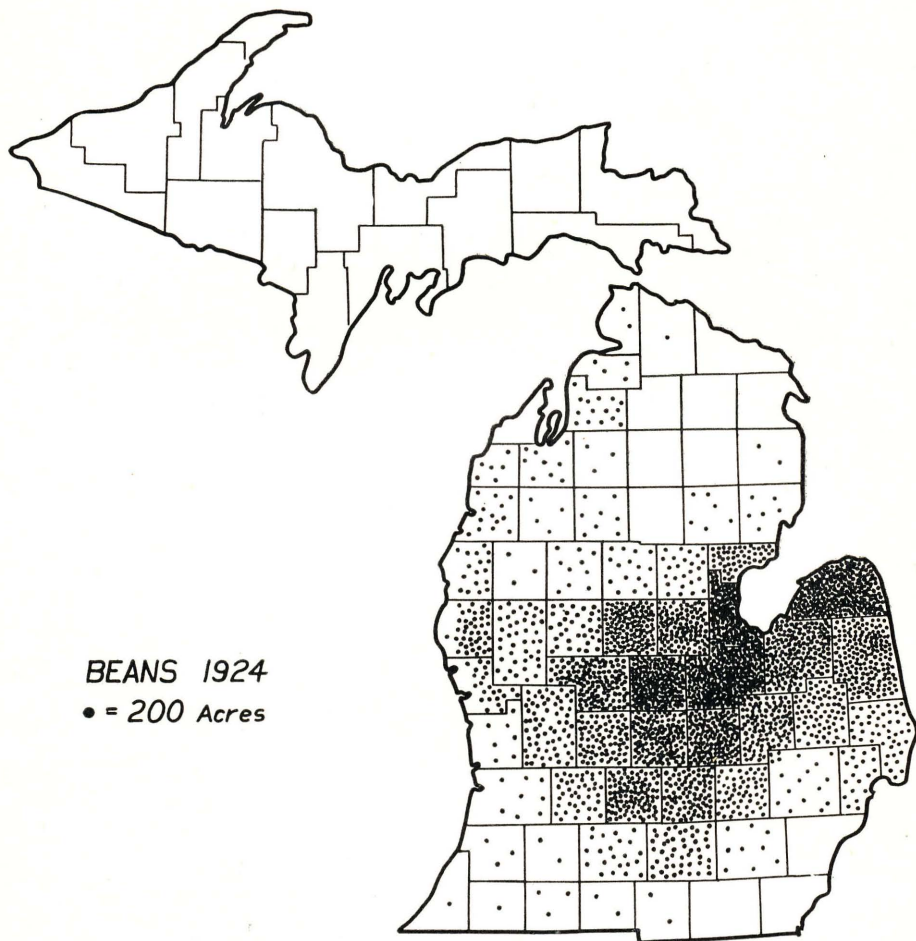


Fig. 15.—Distribution of the acreage of beans in Michigan in 1924. Each dot represents 200 acres. Over a five-year period, 1924-1928, the bean crop was the sixth most valuable in the state. It ranks third among the cash crops.

in the fall with assurance of a good crop. It also gives better results than wheat on soils of less than average fertility.

In addition to the above cash crops, buckwheat, peppermint, chicory, clover seeds, and vegetable seeds are important crops in particular areas. The largest acreages of buckwheat are found in the Thumb section. Michigan is the leading mint producing state in the United States. Mint

is grown chiefly on muck or lowlands in the southwestern portion of the state. Chicory, which requires soil and climatic conditions similar to sugar beets is chiefly grown in Sanilac, Huron, Bay, Midland, and Saginaw counties. Ten thousand acres were produced in 1924. About 95 per cent of the chicory grown in the United States is produced in Michigan. Red, alsike, and mammoth clover seed are produced on the more alkaline soils throughout the state when the seasons are favorable for

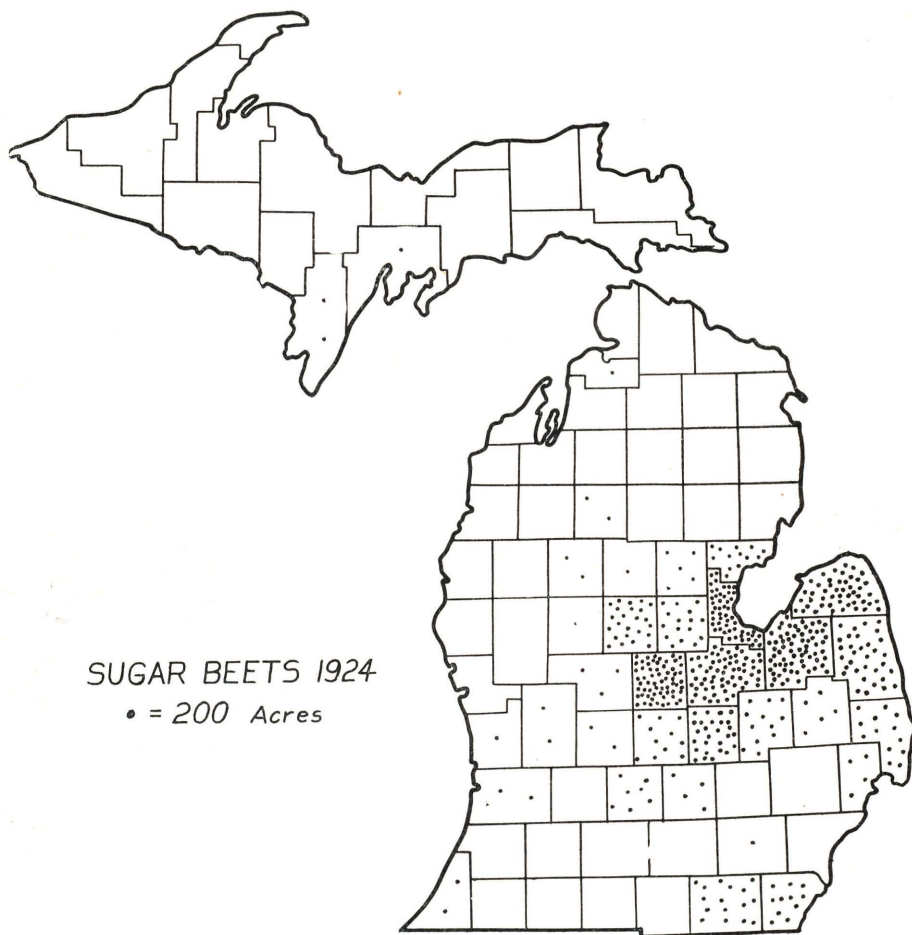


Fig. 16.—Distribution of the acreage of sugar beets in Michigan in 1924. Each dot represents 200 acres. The average annual farm value for the five-year period, 1924-1928, was \$5,763,000.

the setting of seeds. The northern sections of the state are more favorable for clover seed production. Alfalfa seed is grown in a few areas, located chiefly in the Saginaw Valley and in the northern tip of the Lower Peninsula. Vegetable seeds are produced in limited sections throughout the state where seed setting is favorable.

Fruits and Truck Crops

Michigan, on account of favorable climatic conditions, produces a large variety of tree and bush fruits. Farm orchards are found throughout the state but the chief commercial areas are located along Lake Michigan. The modified temperature on account of the proximity of Lake Michigan has been a big factor in determining the location and amount

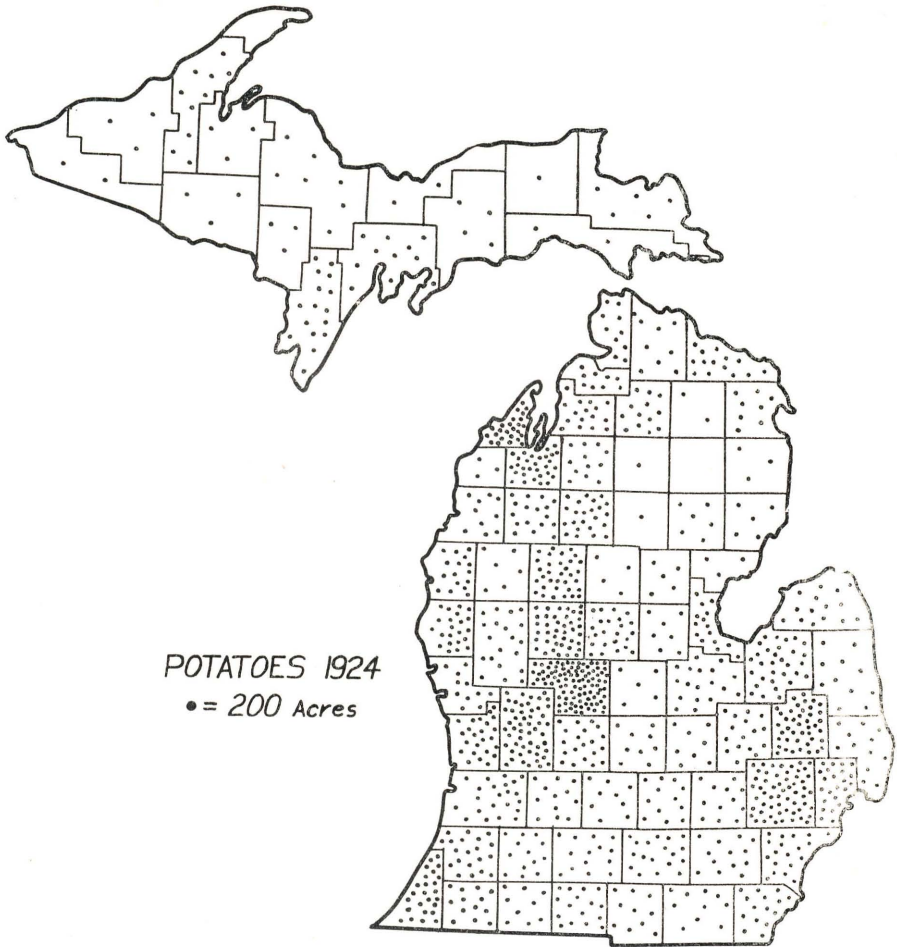


Fig. 17.—Distribution of the acreage of potatoes in Michigan in 1924. Each dot represents 200 acres. Over a five-year period, 1924-1928, the potato crop was the third most valuable of all crops, and was first among the cash crops in the state.

of fruit grown in the state (Fig 18). Berrien and VanBuren are leading fruit counties as they are located closer to the markets to the south. Smaller areas of fruit production are found farther north along the shore of Lake Michigan and in Oakland, Macomb and Kent counties. The tree and vine fruits, in order of importance, are apples, grapes,

peaches, cherries, pears, and plums. The small fruits, as strawberries, raspberries, loganberries, blackberries, cranberries, and currants are raised in many sections of the state, although the type of soil and the nearness to market are more important factors determining their location than in the case of the tree fruits. Many small fruit farms and truck farms which are located around the cities sell their products from roadside markets and on the farmer municipal markets. The importance of the small fruits and truck crops in Michigan is indicated by the fact that the average annual farm value of the small fruits was \$3,300,000 for the five-year period, 1924-1928, while the farm value for the truck crops was \$6,713,000 for the same period (Table 1).

The truck and canning crops are grown mostly in Southern Michigan in selected areas where soil conditions are favorable and markets are near. The nearness and size of consuming centers are important factors in determining the acreage of truck crops in local areas. The largest acreages of sweet corn are found in Shiawassee, Jackson, Antrim, Kent, Wayne, and Gratiot counties. Celery is grown most extensively in the muck sections of Kalamazoo, Ottawa, VanBuren, Kent, and Muskegon counties. Onions are of greatest importance in the muck areas of Allegan, Ottawa, Barry, and Kent counties. Cabbage is grown throughout the state but is most important in Wayne, Saginaw, Ingham, and Branch counties. Snap beans are grown most extensively in Montcalm, Oceana, Kent, Mason, and Berrien counties. Tomatoes, cantaloupes, asparagus, carrots, cauliflower, egg plant, green peas, peppers and spinach are grown principally around the larger cities. On the basis of acreage for the period 1924-1928, cucumber pickles ranked first with an average of about 40,000 acres, followed by green peas with 11,900, sweet corn 11,800, celery 3,800, tomatoes 2,960, cabbage 2,900, onions 2,800, snap beans 2,760, cantaloupes 1,400, and asparagus with 400 acres.

CROP YIELDS IN THE DIFFERENT TYPE-OF-FARMING AREAS*

The yields of crops vary because of differences in climate, soil, and cultural practices, and to damage by plant diseases and insect pests. Climatic changes and variations cause differences in yields from area to area, farm to farm within an area, and from year to year. The soil varies from field to field, farm to farm, and from area to area. Consequently, the yield varies. The damages of diseases and insects vary between farms, between areas, and between years as climate and soil affect the development of diseases and insects. Cultural practices are important in affecting yields between farms but not between areas. In a 10-year average yield, as in Table 2, effects of seasonal climatic changes, and the differences in damages of insects and diseases from year to year are eliminated within an area.

As a rule, each crop has higher yields in certain areas of the state. For example, corn yields and acreages are highest in the southern tier of counties, beans in the Saginaw Valley, and fruit along Lake Michigan. Because of the wide variations in the soils on farms in the state, however, a few farmers are often able to obtain good yields on small acreages adaptable to certain crops, although the larger portions of the soil of their locality is not suitable for the crop. For example, in most sections

*Type-of-Farming area map on page 48, figure 27.

of the state, farmers grow sufficient potatoes to care for their family needs and have a surplus for sale in years when yields are high. Only small acreages of land on these farms are adapted to potatoes, and high yields of good quality could not be obtained on a larger acreage. Consequently, these high yields on small acreages outside the potato area do not indicate that the growing of potatoes on a commercial basis would be a success where land not so well suited for potato culture is used.

Table 2.—Ten-year average yields of Michigan crops by type-of-farming areas, (1918-1927).*

Area	Corn† bu.	Oats bu.	Barley bu.	Tame Hay tons	Winter Wheat bu.	Rye bu.	Beans bu.	Potatoes bu.
1.....	35.2	37.7	28.3	1.3	19.9	15.7	10.2	98.6
2.....	37.2	36.3	24.5	1.3	17.6	14.8	10.6	102.3
3.....	31.7	28.3	20.4	1.1	14.7	12.6	9.1	88.3
4.....	32.3	31.7	25.0	1.2	17.2	12.7	9.7	98.6
5.....	34.8	34.8	24.5	1.2	16.8	14.9	11.1	104.3
6.....	34.8	33.5	25.0	1.1	16.4	14.5	11.1	103.5
7.....	32.7	32.9	26.6	1.2	17.4	15.4	11.6	106.0
8.....	36.1	37.9	28.9	1.4	19.2	15.9	12.6	96.5
9.....	31.1	31.7	25.0	1.2	16.3	15.1	11.5	101.6
10.....	29.4	24.7	21.1	1.1	12.3	14.1	9.9	99.0
11a.....	27.8	23.3	19.5	1.0	14.1	13.4	9.6	103.0
11b.....	32.3	28.1	22.3	1.1	13.9	13.0	9.7	109.0
12a.....	27.4	23.5	18.2	1.0	13.8	12.5	9.0	91.6
12b.....	31.9	30.1	24.3	1.2	16.8	13.5	9.1	93.0
13.....	30.1	29.5	23.9	1.2	16.9	15.7	10.1	108.4
14.....	.....	32.1	25.3	1.3	16.8	18.5	.....	128.0
State Average..	33.5	33.1	24.9	1.23	17.2	13.9	11.2	103.0

*Compilations of data obtained from Michigan Annual Crop Reports issued by U. S. Department of Agriculture in Cooperation with Michigan State Department of Agriculture. The yields are calculated from the county figures, but the counties conform to the type-of-farming areas as closely as possible.

†Corn is not well adapted to Areas 7, 9, 10, 11, 12a, and 13, although the yields here listed would not seem to bear out this statement. Not much of the corn in these areas is husked for grain and usually only the best is so harvested. Some of that which is husked is somewhat immature and contains a relatively high per cent of moisture, thus indicating a higher yield than is actually obtained.

High crop yields do not necessarily mean high net income. The cost of the yields and the price of product must be considered. Farmers are interested in increasing the yields only when the additional cost is less than the increase in the value of the product. For example, a corn farmer can profitably increase his yield of corn from 35 to 40 bushels per acre if the additional cost is less than the value of the five additional

bushels, and if he has no other more profitable alternative enterprise to expand. A change in prices affects the relative profitableness of different yields. As the price of corn increases, farmers may more profitably increase their yields by using more fertilizer and better tillage methods because the increase in value of the additional yields will probably be greater than the additional costs. However, an increase in corn prices will cause farmers to use land less suitable for corn culture and the average yield may be lowered for an area. Most farmers can profitably increase their yields, but a yield is eventually reached where the increase in value of the additional yield is less than the additional cost.

Table 3.—Number and value, and farm production and value of farm production of livestock and livestock products in Michigan for the five-year period, 1924-1928.

Livestock and Livestock Products	Average number, 1924-1928 ¹ in thousands	Average farm value, 1924-1928 ¹ in thousands	Average annual production, 1924-1928 ² in thousands	Average annual farm value of production, 1924-1928 ² in thousands
Horses and mules	498	\$43,351	.....	.....
Cattle and calves	1,477	78,100	261,255 lbs.	\$21,857
Milk cows	877	60,587	.....	.....
Other cattle	576	17,513	.....	.....
Cattle .....	.....	.....	190,951 lbs.	13,499
Calves .....	.....	.....	70,304 lbs.	8,358
Hogs	905	12,344	230,550 lbs.	22,948
Sheep and lambs	1,249	13,166	63,628 lbs.	6,919
Sheep .....	.....	.....	13,949 lbs.	855
Lambs .....	.....	.....	49,679 lbs.	6,064
Chickens	12,579 ³	12,962 ³	17,266 No.	14,833
Eggs .....	.....	.....	866,666 doz.	25,272
Milk .....	.....	.....	4,303,000 lbs.	87,351
Wool .....	.....	.....	7,801 lbs.	2,921
Honey and beeswax .....	.....	.....	3,309 lbs.	588
Other livestock .....	.....	797 ³	.....	.....
Total .....	.....	\$160,720	.....	\$182,689

¹Michigan Crop Reports, as of January 1.

²Farm Value, Gross Income and Cash Income from Farm Products. Section II—Livestock and Livestock Products. Bureau of Agricultural Economics, U. S. D. A.

³1924 Census.

DISTRIBUTION OF LIVESTOCK

Livestock in Michigan was valued at \$160,720,000 and the annual production had a farm value of \$182,689,000 during the period 1924-1928 (Table 3). There have been important shifts in the location of the chief production areas of the different classes of livestock, both within and outside the state, during the past few decades. These shifts may be attributed to the relative profitableness of the different livestock and crop enterprises. The relative profitableness has been affected by changes in local demand, by changes in relative prices, and by changes in production costs. Changes in the habits of consumption and growth of population influence demands and prices of products as milk, eggs, small fruits, and vegetables. The opening of the range areas in the West

where sheep could be produced at lower costs has caused a decrease in the sheep population in Michigan.

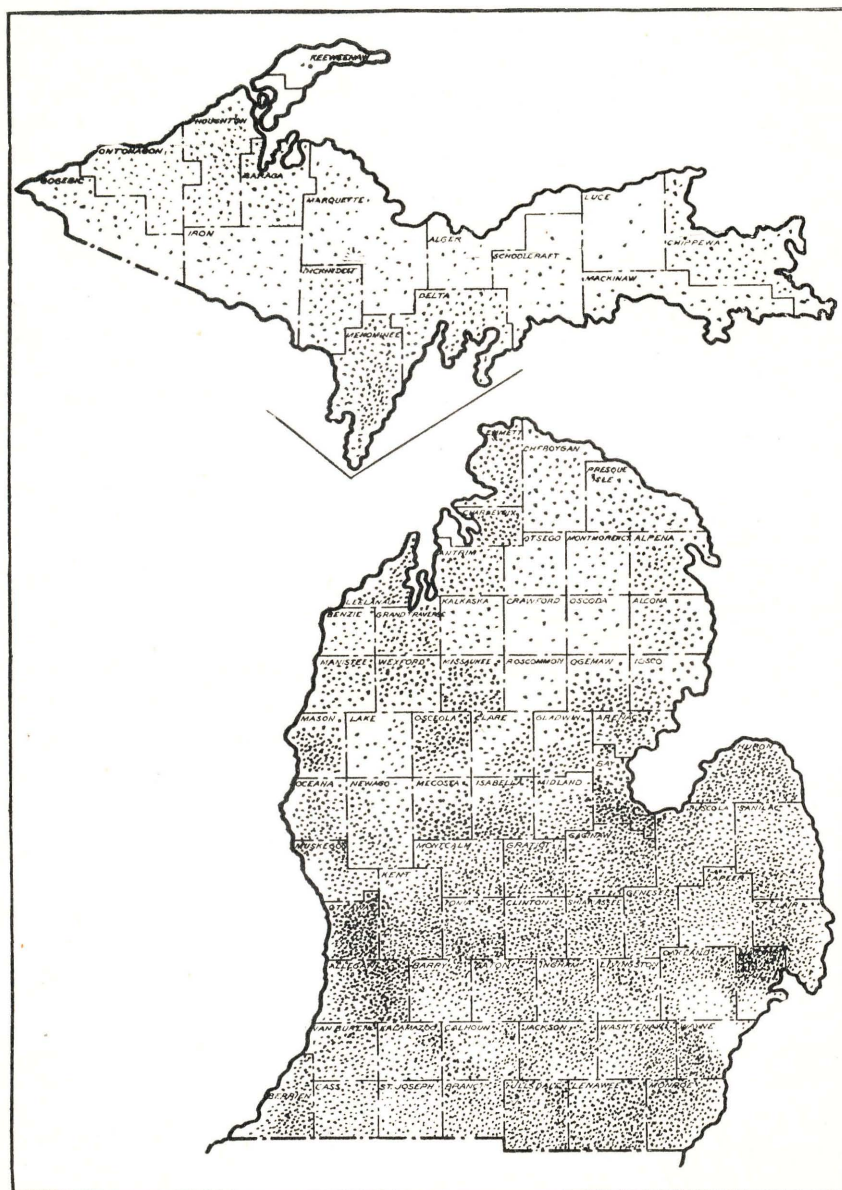


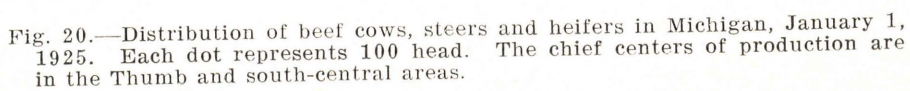
Fig. 19.—Distribution of dairy cows in Michigan, January 1, 1925. Each dot represents 100 head. Dairy cows are distributed throughout the state, but the chief centers are near the large cities. The average annual farm value for the dairy products produced during the period, 1924-1928, was \$87,351,000.

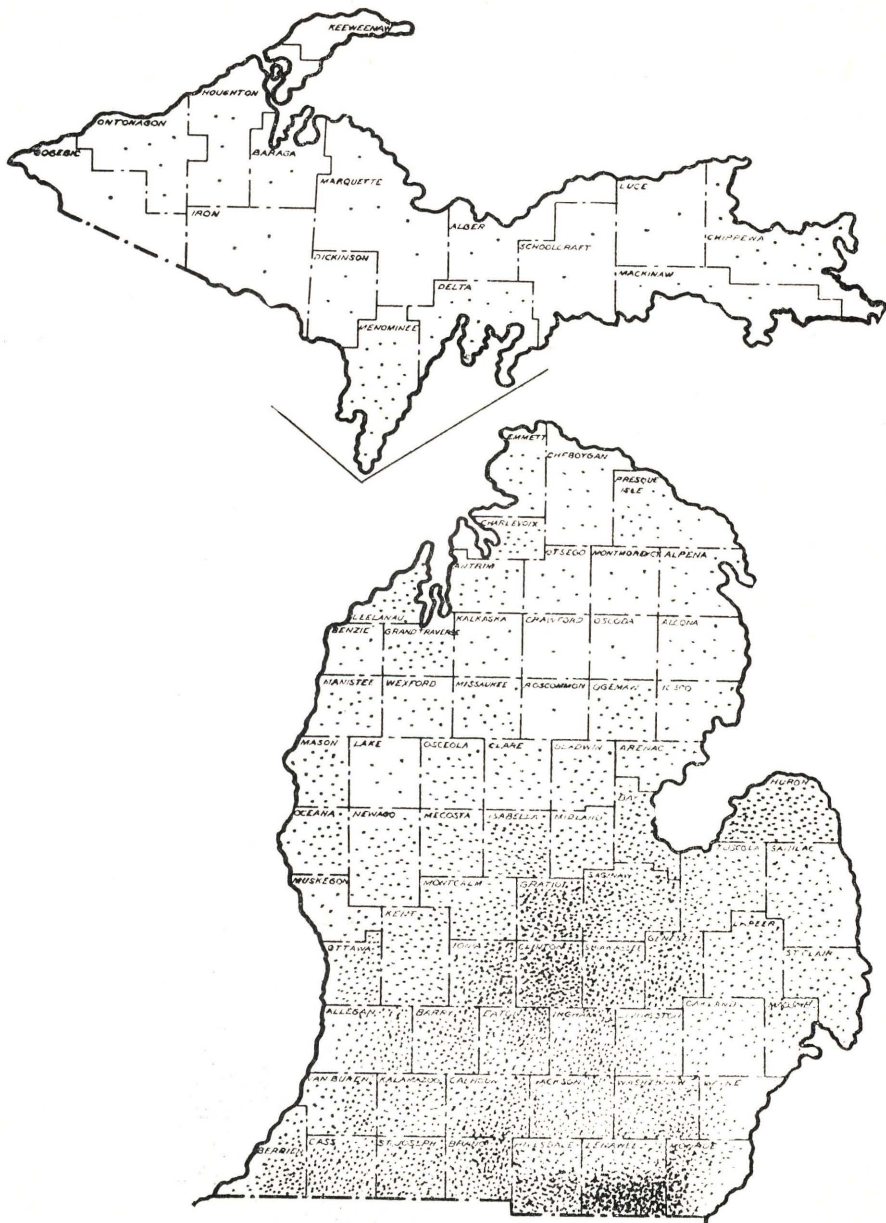
The development of dairying, until it has become the most important industry in the state, has been in response to the demands of the increasing population in the urban centers. During the 25-year period from 1900 to 1925, the population within the state increased from 2,420,982 people to 4,283,860, or an increase of 77 per cent. The number of milk cows increased during the same period from 601,844 to 852,000, or 41 per cent. In 1890, there were 8.7 dairy cows for every square mile of land and, in 1925, there were 14.3 per square mile. There were 519,365 cattle other than dairy cows in 1890 and 565,000 in 1925, or a change of 9 per cent. Other cattle include beef cattle, steers, bulls, and young dairy heifers. The number of other cattle reached a peak of 963,000 in 1910 and have been declining in numbers since. Dairy cows are well distributed throughout the state but are the most numerous in the southern half of the Lower Peninsula on account of the nearness to the large milk markets (Fig. 19). The greatest concentration of dairy cattle is found around Detroit, Grand Rapids, Flint, Saginaw, Lansing, and other large urban centers. Dairying is the major livestock enterprise in the Upper Peninsula because of the abundance of hay and pasture and the relatively small farms. The fluid milk areas are located around the cities, while butter and cheese are produced farther away from the cities. Cheese is chiefly produced in the Upper Peninsula where the summer seasons are cool.

The 1925 census reports 183,198 head of beef cows, steers, and beef heifers in the state on January 1, 1925. Beef cattle are found in about all sections but are most concentrated in the south-central and the Thumb areas in regions which are usually outside the areas which produce fluid milk for the urban centers (Fig. 20). As the demand for milk increases and the milk producing areas increase in size, beef production and butter production are pushed farther away from the urban centers. Beef breeding is important in Sanilac, Washtenaw, Calhoun, Lapeer, Huron, and Isabella counties. Portions of Huron, Sanilac, and Lapeer counties are adapted to beef breeding because of the abundance of hay and pasture, the limited quantities of grains, and the distance from a fluid milk market. Small areas in practically all the counties contain land which produces hay and pasture, and only limited quantities of grain. Beef breeding is one of the better alternatives on such land. Beef feeding is mainly found in Lenawee, Hillsdale, Ionia, and Clinton counties. These counties produce beef instead of milk because they produce larger quantities of corn and roughages and in addition they are on the outskirts of the fluid milk market areas.

The important centers of hog production are found in the southern section of the state where the climate and soil favors corn production (Fig. 21). Lenawee, Hillsdale, Monroe, Clinton, and Gratiot are the chief pork producing counties. The number of hogs has been declining since 1890 as more of the feed crops are needed to produce milk. There were 20 hogs for every square mile of land in 1890 and 15 in 1925. Hogs are raised in all sections of the state, but outside of the corn sections hogs are raised to consume skim milk or to produce the family pork from various farm by-products.

During the period from 1870 to 1890, sheep were more important than at the present time in Michigan. On account of the opening of ranges in the West and the increasing profitableness of other classes of live-





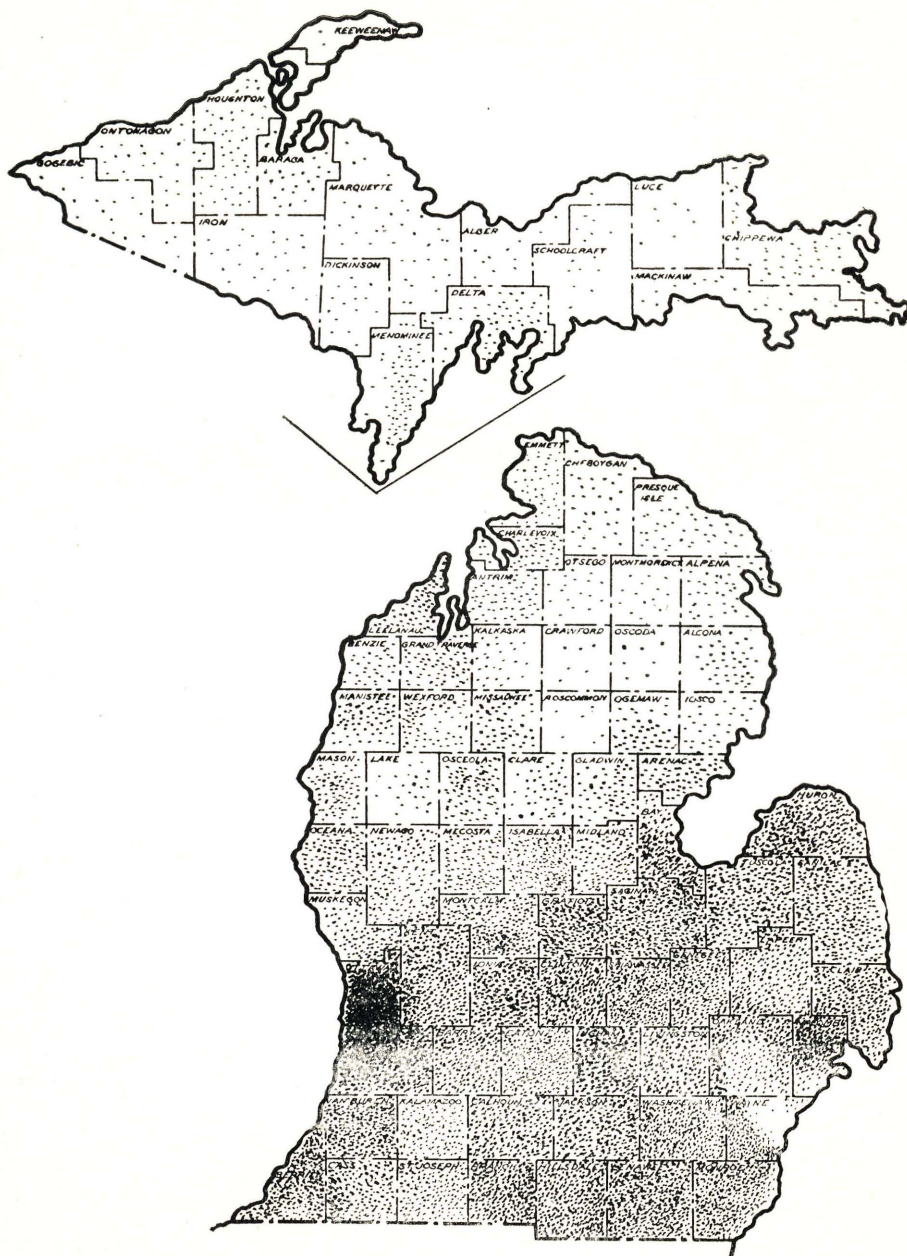


Fig. 23—Distribution of chickens in Michigan, January 1, 1925. Each dot represents 1000. The average annual farm value of poultry and egg production for the five-year period, 1924-1928, was \$40,105,000.

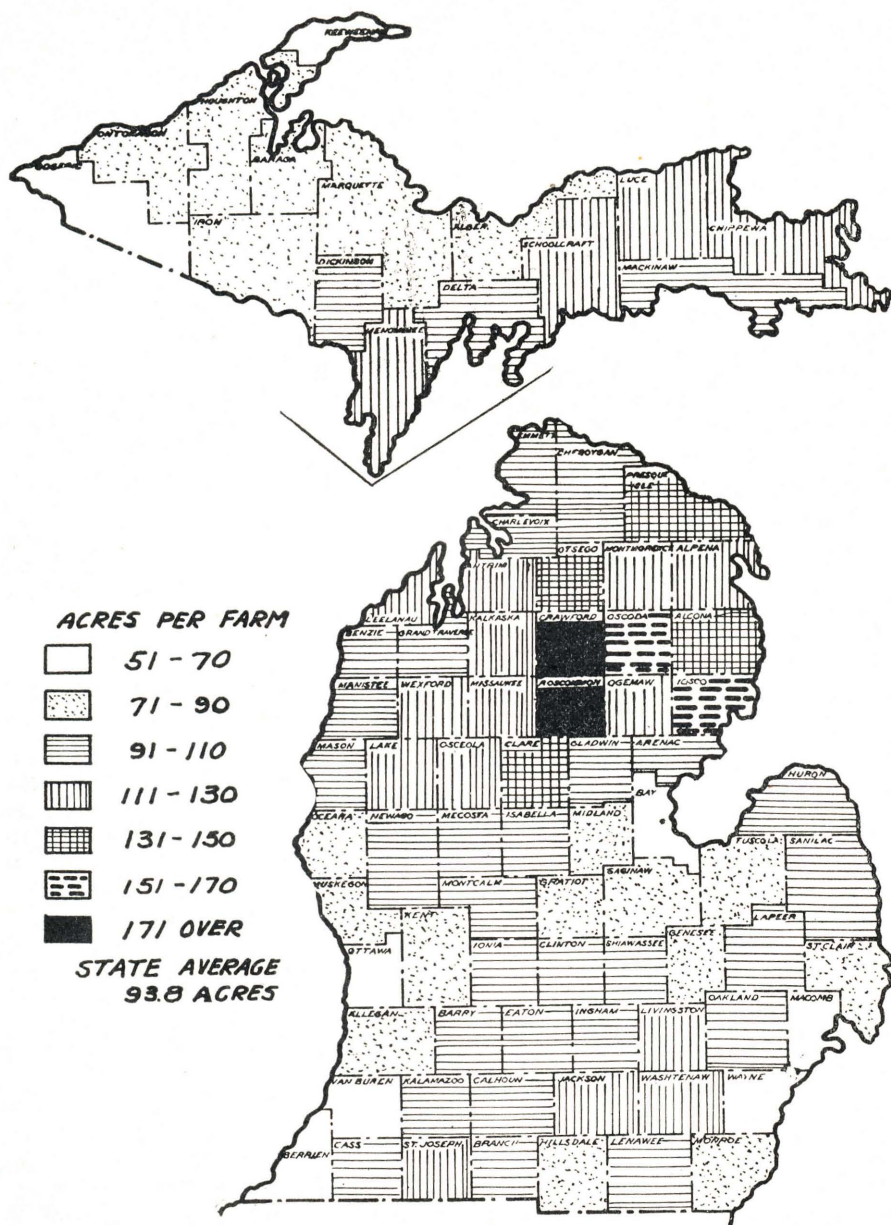


Fig. 24.—Size of farms, 1924. Michigan's farms usually are not large. The most common sizes are the 40, 80, 120, and the 160-acre farms.

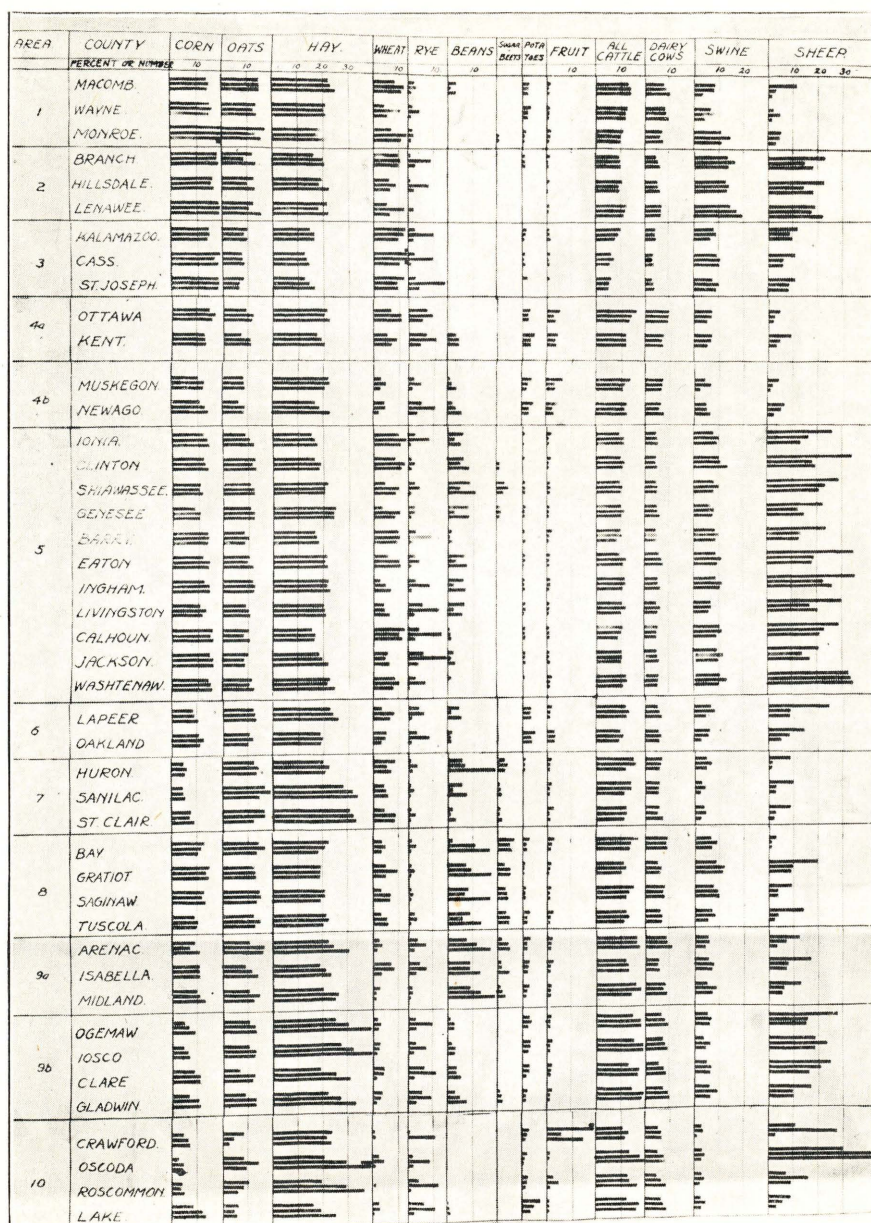


Fig. 25.—Distribution of crops and livestock by counties and by Type-of-Farming Areas 1 to 10 for 1910, 1920, and 1925. The distribution of crops is in percentages of improved land in the crops. The distribution of livestock is in animals per 100 acres of improved land. The top bar is for 1910, the middle for 1920, and the bottom is for 1925.

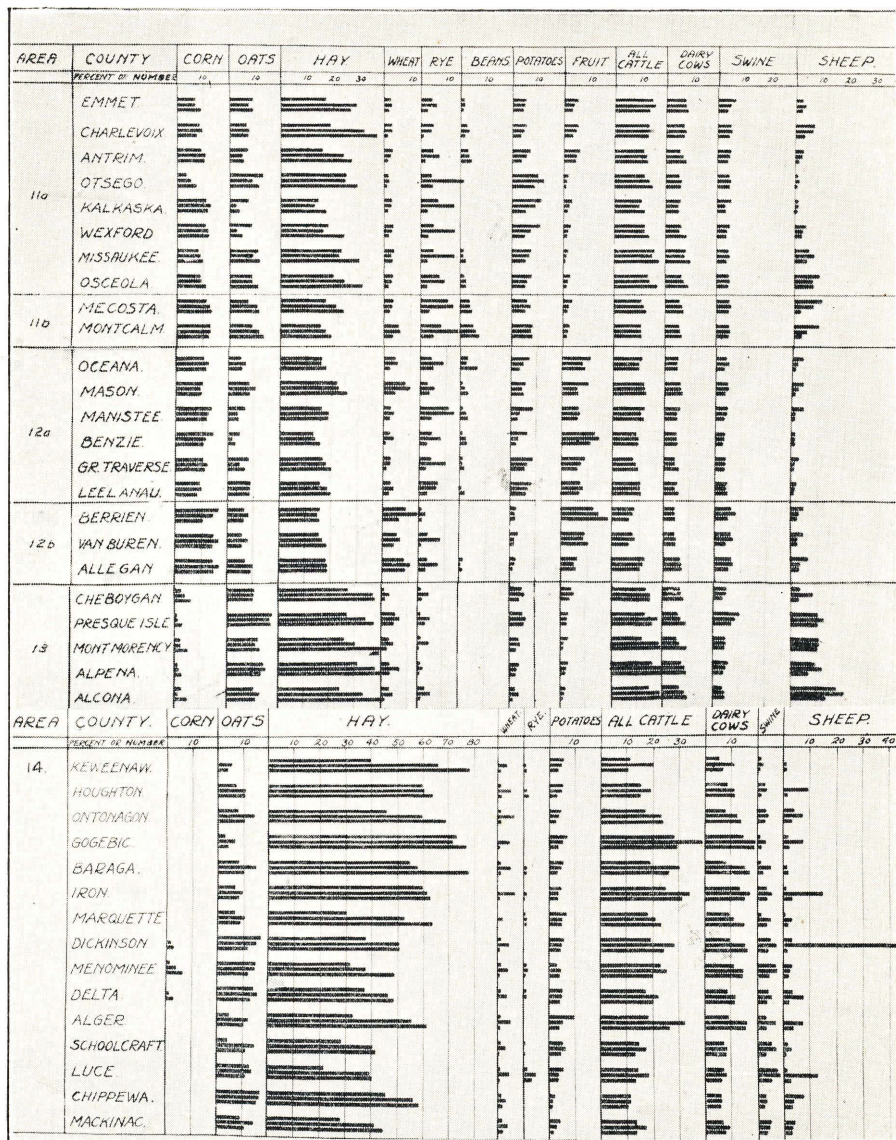


Fig. 26.—Distribution of crops and livestock by counties and by Type-of-Farming Areas 11 to 14 for 1910, 1920, and 1925. The distribution of crops is in percentages of improved land in the crops. The distribution of livestock is in animals per 100 acres of improved land. The top bar is for 1910, the middle for 1920, and the bottom is for 1925.

the state to check with farmers and County Agricultural Agents. It was then revised to the present form (Fig. 27).

TYPICAL FARMING SYSTEMS IN THE DIFFERENT TYPE-OF-FARMING AREAS

Up to this point the discussion has been concerned primarily with the determination and description of the important type of farming areas in Michigan. A general description of the crops and livestock found in the different areas has been given but in just what various combinations they are found in the different areas or on the same sizes of farms in each area has not been indicated. In this section of the bulletin, our aim is to go into this and present in considerable detail the systems of farming followed on the various sizes of farms in each type-of-farming area of the state.

Although conditions within a given type-of-farming area are fairly homogeneous, rather wide variations in the farming systems followed on individual farms are likely to be found. There are a number of factors responsible for this. In the first place, even though there is a high degree of uniformity in the soil type and topography of a particular type area as a whole, in specific localities and on particular farms rather wide differences may occur. Because of these differences, individual farmers may find it to their advantage to follow a system of farming which is quite different from what the group follows in the same area.

Farmers also vary widely in their abilities and financial circumstances. Some farmers feel the acquisitive urge more keenly than do others and will take advantage of every opportunity. They react very quickly to price changes and attempt to keep their production in line with market requirements. There are other farmers who are less price sensitive. They do about the same thing year after year, clinging in many cases to an organization which the majority relinquished long ago. There are always some farmers in a community who lead the way and are the first to adopt new practices and to make changes. Others lag from one to several years behind the leaders. This difference in aptitudes among farmers undoubtedly is an important reason for variations in organizations found in many communities.

Still another factor causing variations in farming systems in specific areas is the amount of family labor available on different farms. Farmers with a large amount of family labor are more likely to follow, other things being equal, a more intensive type of farming than are those who do not have such labor.

Operation by owners or by tenants may also cause variations in farming systems from farm to farm in a particular area. A tenant operator does not always have complete freedom of choice as to the amount or proportion of the enterprises he handles each year. Because of limited possession of the farm, both as to length of time of operation and assets on the farm a tenant does not develop certain enterprises as he would if he were an owner.

Likewise, an encumbered title or a lack of working capital may account for some of the variations in farming systems. A farmer with a heavy mortgage debt will be disposed to push his resources to the highest limits of profitability. He will make rapid shifts in particular or alternative

They are not interested in making the farm yield the last possible dollar and are content to work along in a more leisurely way.

These are some of the many factors which are responsible for differences in farm organizations in particular areas, and which account in large measure for the wide variations in organizations on farms of the same size in areas having homogeneous soil and climatic conditions.

Despite this tendency toward wide variability in farm organizations, there usually is in each area one predominating type of organization for each size of farm. This dominant organization is usually built around the most profitable crop or class of livestock in the area.

Method of Determining Typical Farming Systems

The typical farming systems presented in the following discussion are based on special tabulations of the 1925 census. Approximately 8,000 individual farm records were used as a basis for determining the organizations typical of the different areas. These records were obtained from 48 representative townships in the 14 type-of-farming areas in the state. The number of records in each area varied considerably, depending upon the size of the type area and upon its uniformity. From 200 to 300 records were obtained in most of the townships selected in the areas and the range was from about 150 to 600.

Table 4.—Distribution of farms by size in representative townships in the Saginaw Valley, Area 8.

Size—Group	Per cent of the total number of farms in each size group in:			
	Gratiot	Saginaw	Tuscola	Total
<i>Acres</i>	<i>per cent</i>	<i>per cent</i>	<i>per cent</i> ¹	<i>per cent</i>
0-30.....	13.0	5.6	10.0	10.0
31-50.....	15.8	30.0	11.2	17.8
51-70.....	9.7	3.8	9.2	8.0
71-90.....	28.7	37.5	37.0	33.8
91-110.....	6.4	1.2	8.0	5.6
111-130.....	11.3	8.8	11.1	10.6
131-150.....	5.7	1.2	2.2	3.3
151-170.....	4.8	5.6	8.0	6.1
171-over.....	4.4	6.2	3.3	4.5

Since the method of analysis was the same in all these areas, a description of the procedure followed in one of them will suffice for all the others. For this purpose the bean and sugar beet area in the Saginaw Valley will be used. Census data on 615 farms in three representative townships in this area were used as a basis for determining the typical farming systems. The farms were first sorted by size to get farms of the same size together and to determine what sizes are most commonly found. Table 3 shows the distribution of the farms by size in the representative townships taken in the three counties.

The 80-acre farms, 71-90 acres, are the most common size. Approximately one-third of the farms in the area are of this size. The 40-acre

farms are next in importance, followed by the 140, 20, and 60-acre sizes. There is to be noted a high degree of uniformity in the different size groups in the three counties. While there is a larger proportion of 40-acre farms in Saginaw than in the other two counties, there are fewer 20 and 60-acre farms. The 80-acre and other sizes are quite similar.

With the farms sorted into size groups, our next problem was to determine what are the prevailing organizations in each size group and to see if there is any tendency for these to vary on the different sizes of farms. Accordingly, the farms in each size group were sub-sorted, arrayed, and tabulated on the basis of one of the dominant enterprises in the area. The acreage of beans in this area was used for this purpose. The acreages in the other crops as well as the number of each class of livestock handled are also tabulated and included in the arrayed tables, each line in the table representing the organization of an individual farm.

By this process of sorting, sub-sorting and arraying, the farms of the same size and organization are thrown together and the typical organizations prevailing on the different and also on the same size of farms in each area can at once be determined. Just how the farms of a particular size in this area appear when sorted and arrayed on this basis is shown in Fig. 28. The proportion of the farm area in each crop is shown rather than the actual acreages.

Probably the most outstanding thing about this chart which will first attract the reader's attention is the wide variation in the acreage of beans and other crops on the different farms. The acreage in beans varies from none to as high as 48 per cent of the farm area. The other crops also vary quite widely. There is too wide a range in the acreage of the different crops to give a group average which will be representative of what a very large number of the farmers are doing. An arithmetic mean of such a distribution is too much distorted by the extreme items to be trustworthy.

Although there is quite a wide variation in the farms as a whole, closer study will reveal that certain of the farms tend to be grouped around fairly distinct centers. Thus, starting at the top of the chart and going down, there is a small group of farms which have 30 per cent or more of the farm area in beans. (The relative importance of the other crops and livestock may be seen by following across the page.) Just below this group there is another group, comprising more farms, with around 25 per cent of the farm area in beans; still another with from 18 to 20 per cent in beans; a fourth with from 12 to 15 per cent in beans; a fifth with from 5 to 10 per cent and finally a group with no beans at all. Thus, instead of one average organization for the farms of this size there really are five or six organizations each of which is distinctive enough to be kept separate from the others. The range in the acreage of the different crops in these typical groups is much narrower and an average of the farms in them will really be representative of the individual farms of the group. Instead of taking an arithmetic mean of these groups, however, it is usually better to take a median or mode. This can be done by inspection quite accurately, thus avoiding lengthy computations.

The farm systems resulting from such an analysis, we term typical farming systems. They are typical of what individual groups of farmers, on given sizes of farms and in homogeneous type of farming areas, are doing who are following a similar type of farming. The same method

*VARIATION IN ORGANIZATION ON FARMS OF A PARTICULAR
Representative Area in Saginaw Valley.*

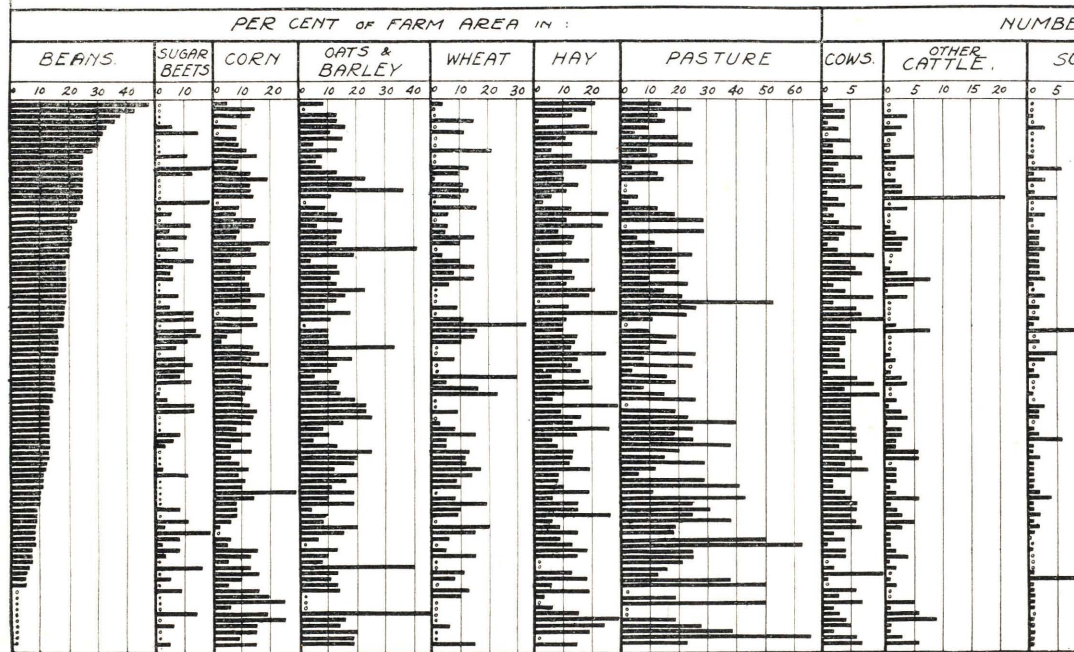


Fig. 28.—An array of the organization on farms of similar size in Area 5, sorted per cent of farm area in beans.

of approach was followed for the other sizes of farms in the same area. Farming systems typical of the homogenous groups on each size of farm are shown. An analysis such as this adds greatly to the precision and accuracy with which the farming systems of an area can be shown. Just how these typical farming systems may be used by research and extension agencies in adding to the accuracy and effectiveness of their work will be shown presently.

Using this same method of approach, typical farming systems were set up for the different sizes of farms in the other important type of farming areas in the state. These farming systems are presented below in detail.

Dairying and Truck Crops Area—1

This area, adjacent to the good markets of Detroit and vicinity, is one of the most intensive dairy regions of the state. There are also quite a number of poultry farms and poultry is an important enterprise on many dairy farms. The expansion of the acreage of truck crops on suitable soils has been very marked. Wheat and oats are the important

Table 5.—Typical farming systems in Area 1 of southeastern Michigan (Macomb county).¹ Special tabulations 1925 census.

Basis of Grouping	40-Acre Farms	60-Acre Farms		80-Acre Farms		100-Acre Farms		160-Acre Farms
	3-8 Cows	3-8 Cows	6-11 Cows	7-10 Cows	7-10 Cows	7-10 Cows	12-15 Cows ²	10-16 Cows
Relative frequency of type in per cent	54	41	47	26	45	54	20	90
	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>
All Crops.....	28	33	39	49½	54	65	89	86
Corn.....	8	7	9	12	12	14	13	18
Wheat.....	6	7	8	12	10	14	13	13
Oats and Barley.....	7	8	9	12	12	14	14	18
Hay.....	7	10	12	12	20	18	25	35
Potatoes.....		1	1	1½		1½	1	2
Beans.....						0-7	0-6	
Pasture.....	8	18	18	25	18	25	25	50
Other Land.....	4	5	3	3	4	8	2	10
Livestock:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Horses.....	2	2-3	3	3	3	4	4	4
Cows.....	3-8	3-8	6-11	7-10	7-10	7-10	12-15	10-16
Other Cattle.....	0-3	0-3	0-3	0-2	0-3	2-6	2-8	1-7
Poultry.....	50-150	50-150	75-125	120-150	100-125	80-150	75-125	75-125

¹The 30-acre farms represent 6%; the 40-acre farms 17%; the 60-acre farms 19%; the 80-acre farms 23%; the 100-acre farms 16%; and the 160-acre farms 4% of all the farms. The other farms either were too small or too scattered to group.

²Approximately 15% of the farms had the same crop organization, but had only from 3-5 cows.

small grain crops. Small areas of fruit are located in the vicinity of Romeo and Northville. Since land values are as high or higher than found elsewhere in Michigan, investment costs are high. It is, therefore, an area where intensive types as well as intensive methods of farming must be followed. The topography is level to gently rolling. The nearby cities provide excellent markets for poultry and dairy products and for fruit and truck crops. Farms tend to be smaller than the average of the state because of the favorable conditions for the intensive, specialized type of farming. On account of the rapid expansion of the metropolitan

area and consequent absorption of farm land for urban uses, the price of land in many sections exceeds its value for farming purposes. Considerable areas that were farm land in 1915 and 1920 have since been sub-divided or purchased for sub-divisions and farming has been abandoned. According to the March 1926 Crop Report, prices of farms ranged from \$150 to \$250 per acre.

The typical farming systems found in Area 1, are shown in Table 5. The organizations in Macomb County probably typify the prevailing situation better than do those of the other counties. In this county, the 80-acre farm is the most common in size, comprising about one-fourth of all farms. The 60, 40, and 100-acre farms are next in importance in point of numbers. The most common organization on the 80-acre farms has about 54 acres in crops, 12 acres of which are in corn, 10 acres in wheat, 12 acres in oats and barley, and 20 acres in hay. In addition, there are 18 acres of pasture and 4 acres of other land. There are also 7-10 cows, 0-3 other cattle, and 100-125 hens. Approximately 45 per cent of the farmers on this size of farm follow this organization. There are two other organizations on this same size of farm which are commonly followed. One of these organizations has from 3-5 cows and the other from 7-10 cows. While the latter organization has the same number of cows as the most common one, it has only about 60 per cent as much hay, 12 acres as against 20 acres. About 26 per cent of the 80-acre farmers follow this organization and 18-20 per cent follow the one having 3-5 cows. On the other sizes of farms, similar variations in the farming systems are to be noted. See Table 5.

In the eastern half of Washtenaw County, the 80-acre farm is the dominant size, followed by the 140-160 and the 200-acre farms. On the 80-acre farms, 4-10 cows are most common; on the 140-acre farms this increases to 8-15; on the 160-acre farms, to 10-15; and, on the 200-acre farms, this increases to 10-25 cows. The 160-acre farms have about 25 acres of corn, 15 of wheat, 25 of oats and barley, 30 of hay, 40 of pasture, and 18 acres of other land. They have about 4 horses, 2-6 other cattle, 0-3 sows, and 75 to 120 hens.

In the southern part of St. Clair county, the farms are smaller on the whole than in Washtenaw. The 80-acre farm, however, is still the dominant size. There are fewer dairy cows, somewhat less corn and more hay than in the other counties in this area.

An examination of the organizations for Monroe county show a much higher acreage of corn than is found on the farms in Wayne, Macomb, and St. Clair counties. In this respect, the organizations are more nearly like those in Lenawee. Much the same applies to hogs. In number of dairy cows, however, the organizations are more like those in the whole-milk area. Since the dairy enterprise is probably the most important in point of income, Monroe county has been included in Area 1 instead of with the corn and general livestock area.

Corn and Livestock Area—2

The soil and climate of this area more nearly approach corn-belt conditions than those of any other region of the state. Thus, we find corn an important crop and we find the usual complement of hogs, cattle, and sheep. Poultry is important in Lenawee county. Much of the milk

is marketed in Detroit and Toledo, while some is handled by local condenseries. All grain crops do well and wheat is the major cash crop. In 1924, corn occupied 16 to 20 per cent, wheat 8 to 10 per cent, oats and barley 12 to 15 per cent, and hay 18 to 22 per cent of the improved land in farms.

The surface of much of the area is level or slightly rolling and is adapted to the use of large scale farm machinery. In Hillsdale County the land is more rolling and hilly. The soil is generally fertile. The growing season is long and warm. Farm land prices average among the highest in the state, from \$65 to \$120 per acre according to the March 1926 Crop Report.

The typical farming systems for Area 2, as shown in Tables 6 and 7, are based on records from about 609 farms in representative townships in Lenawee and Hillsdale counties.

Table 6.—Typical farming systems in Area 2, the corn and general livestock section of southern Michigan (Lenawee county).¹ Special tabulations 1925 census.

Basis of Grouping	60-Acre Farms		80-Acre Farms		120-Acre Farms		160-Acre Farms	180-Acre Farms
	15 Acres Corn	22 Acres Corn	16 acres Corn	23 Acres Corn	24 Acres Corn	35 Acres Corn	50 Acres Corn	45 Acres Corn
Relative frequency of type in per cent	56	31	28	53	58	19	67	60
	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>
All Crops.....	46	45	58	61	83	95	126	129
Corn.....	15	22	16	23	24	35	50	45
Wheat.....	6	6	12	9	19	15	22	30
Oats and Barley.....	15	9	16	16	20	25	24	32
Hay.....	10	8	14	13	20	20	30	22
Pasture.....	10	11	15	14	25	20	25	40
Other Land.....	3	4	5	5	7	5	6	10
Livestock:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Horses.....	3	3	3	4	4 ²	4 ²	5 ²	4 ²
Cows.....	3-6	3-7	2-4	4-8	3-7	4-6	4-8	10-15
Other Cattle.....	2-3	0-1	0-3	2-4	2-5	2-8	0-4	3-10
Sheep.....	0	.....	0	0	0	0-50	0	0
Sows.....	2-3	2-3	0-3	0-4	3-5	4-8	2-8	0-10
Poultry.....	100-150	80-150	75-150	100-200	100-150	75-125	100-200	75-125

¹The 40-acre farms represent 17%; the 60-acre farms 19%; the 80-acre farms 17%; the 120-acre farms 19%; the 160-acre farms 8%; and the 180-acre farms 5% of all farms.

²Tractor.

In Lenawee county, the 40, 60, 80, and 120-acre farms are about of equal importance as far as numbers go. These four sizes of farms represent from 70 to 75 per cent of all farms. There are some 160 and 180-acre and larger farms but they represent a much smaller percentage of the total. On each of these sizes of farms, there are found two organizations which most of the farmers follow. On the 120-acre farms, there is an organization which about 58 per cent of the farmers on this size of farm follow. This organization has about 24 acres of corn, 19 acres of wheat, 20 acres of oats and barley, 20 acres of hay, 25 acres of pasture, and 7 acres of other land, and 4 horses, 3-7 cows, 2-5 other cattle, no sheep, 3-5 sows, and 100-150 poultry. There is another organization which 19 per cent of the farmers follow, with 35 acres of corn, 15 acres of wheat, 25 acres of oats and barley, 20 acres each of hay and pasture, and 5 acres of other land, and with 4-6 dairy cows, 4-8 sows,

a few sheep and 75-125 hens. On the other sizes of farms, much the same variation is shown, see Table 6.

In Hillsdale county the 80-acre farm is more dominant than in Lenawee. The most common organization on the 80-acre farm has 12 acres of corn, 8 acres of wheat, 10 acres of oats and barley, 20 acres of hay, 20 acres of pasture and 8 acres of other land, and 3 horses, 2-4 cows, 0-15 sheep, 1-3 sows, and 75-150 hens. About 60 to 65 per cent of the farmers on the 80-acre farms follow this organization. There is another organization on this size of farm with only about 7 acres of corn which 25 to 30 per cent of the farmers follow. The prevailing organizations on the other sizes of farms may be seen from Table 7.

A comparison of Tables 6 and 7 will show that the organization in Lenawee has more corn and hogs than in Hillsdale but the latter has more sheep. There is a sheep feeding center in the northeastern part of Lenawee county. In the southeastern corner, there is considerable steer feeding. Neither of these enterprises is shown in these organizations because the data are taken from a township outside of each specialized area.

Table 7.—Typical farming systems in Area 2, the corn and general livestock section of southern Michigan (Hillsdale county).¹ Special tabulation 1925 census.

Basis of Grouping	40-Acre Farms		80-Acre Farms		120-Acre Farms		160-Acre Farms	
	6 Acres Corn Most Common	12 Acres Corn	7 Acres Corn	12 Acres Corn Most Common	16 Acres Corn Most Common	22 Acres Corn	16 Acres Corn Most Common	22 Acres Corn
Relative frequency of type in per cent	62	12	28	63	55	21	60	30
	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>
All Crops.....	26	30	36	50	66	68	76	80
Corn.....	6	12	7	12	16	22	16	22
Wheat.....	5	0	7	8	11	7	10	16
Oats and Barley.....	6	8	8	10	17	14	25	17
Hay.....	9	8	14	20	22	25	25	25
Pasture.....	10	7	25	20	35	35	60	35
Other Land.....	3	4	15	8	15	12	15	35
Livestock:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Horses.....	2	2	3	3	4	4	4	4
Cows.....	0-3	0-2	0-4	2-4	2-8	2-6	3-6	4-8
Other Cattle.....	0-1	0-1	0-3	0-4	0-4	0-3	0-4	0-3
Sheep.....	0	0	0-20	0-15	0-20	0-30	0-50	0-60
Sows.....	0-2	0-1	0-2	1-3	2-5	1-3	0-3	2-3
Poultry.....	75-125	60-100	50-100	75-150	100-150	125-200	75-100	125-250

¹The 25-acre farms represent 5%; the 40-acre farms 19%; the 80-acre farms 36%; the 120-acre farms 19%; the 60-acre farms 9% of all farms.

Small Grains and Livestock Area—3

This area is somewhat similar to Area 2 but has about one-third less cattle and swine, and one-half less sheep per 100 acres of improved land. In further comparison with Area 2 we find a similar percentage of the improved farm land in corn, more in wheat and rye, and less in hay and oats. Mint, celery, and onions are of importance in local areas, mostly on the muck soils. In 1924, corn occupied 14 to 18 per cent, oats and barley 6 to 10 per cent, wheat 10 per cent and hay 15 per cent of the improved land in farms.

This area has a wide range of soil conditions and includes some light sands as well as some of the heavier soils. In general, the soils are mostly sands and sandy loams of low to medium fertility and acid in reaction. The soil is the major factor causing the difference in type of agriculture of this region as compared with Area 2. The climate is similar to that of Area 2. Nearby markets in some sections have favored the development of the dairy enterprise. The most common size of farm is 120 acres. This is larger than the average of the state because of the lighter types of soils. The prices of farms, generally lower than in the surrounding areas, range from \$50 to \$75 an acre (March 1926 Crop Report).

Table 8.—Typical farming systems in Area 3, the small grain and livestock section of southwestern Michigan (St. Joseph county).¹ Special tabulations 1925 census.

Basis of Grouping	80-Acre Farms		120-Acre Farms		160-Acre Farms		200-Acre Farms	
	No Wheat	12 Acres Wheat	No Wheat	14 Acres Wheat	13 Acres Wheat	22 Acres Wheat	23 Acres Wheat	35 Acres Wheat
Relative frequency of type in per cent	39	28	29	35	34	25	37	33
	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>
All Crops.....	45	47	73	75	87	110	119	131 ½
Corn.....	12	12	20	20	20	28	35	35
Wheat.....	0	12	0	14	13	22	23	35
Oats and Barley.....	6	6	10	12	11	22	18	20
Rye.....	4	2	15	7	10	12	12	15
Hay.....	18	15	23	18	22	25	30	25
Potatoes.....			2	2	1	1	1	1 ½
Other Crops.....	5	0	3	2	10 ²			
Pasture.....	20	20	25	25	45	35	40	35
Other Land.....	10	10	20	15	25	12	25	30
Livestock:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Horses.....	2	3	3	3	4	4	4	4
Cows.....	1-4	2-4	2-5	2-5	2-5	2-6	2-5	2-4
Other Cattle.....	0-3	0-3	0-2	0-3	2-6	0-3	2-6	0-3
Sheep.....	0	0	0-30	0-30	0-20	0-15	0-30	0-20
Sows.....	0-2	1-2	0-3	0-3	0-5	0-3	2-5	2-4
Poultry.....	50-100	75-125	50-100	50-100	75-125	75-125	75-100	75-125

¹The 40-acre farms represent 10%; the 80-acre farms 18%; the 120-acre farms 23%; the 160-acre farms 18%; and the 200-acre farms 9% of all farms.

²Buckwheat.

In Area 3, records were taken from 290 farms in a representative township in St. Joseph County. The typical farming systems are shown in Table 8. In St. Joseph County the 120-acre farm comprises approximately one-fourth of the farms of all sizes. The 80 and 160-acre farms are next in importance and are followed by the 40 and 200-acre farms. These sizes represent about 80 per cent or more of all farms.

The most common organization on the 120-acre farm provides for 75 acres in crops, 20 acres of which are in corn, 14 acres in wheat, 12 acres in oats and barley, 7 acres in rye, 18 acres in hay, and 2 acres in potatoes and other crops. About 35 per cent of the farmers on this size of farm followed this organization. There is another organization on this same size of farm followed by about 30 per cent of the farmers, which has no wheat but has 15 acres of rye as compared with 14 acres of wheat and 7 acres of rye on the other one. The two organizations have about the same amount of pasture and livestock. The other sizes of farms have

similar variations in their organizations. Reference to the tables will show just how extensive these are and about what proportion of the farmers on each size of farm follow them.

Dairying and Poultry Area—4

This is one of the most intensive dairy and poultry regions in the state. Chick hatcheries are numerous. Wheat and truck crops are the major cash crops. Mint, celery, and onions are important in limited areas where the soil is favorable. The average size of farm tends to be smaller than in adjoining areas. The price of farm land is about the same as is found in the general farming area to the east, from \$80 to \$85 an acre (March 1926 Crop Report). Grand Rapids, Muskegon, Grand Haven, and Kalamazoo as well as Chicago are the principal markets. In 1924, corn occupied 14 to 16 per cent, oats 12 per cent, wheat 8 to 11 per cent, rye 5 to 7 per cent and hay 20 to 22 per cent of the improved land in farms. Topography is level to rolling.

Table 9.—Typical farming systems in Area 4, the general dairy farming, poultry and special crop section of southwestern Michigan (Ottawa county).¹ Special tabulations 1925 census.

Basis of Grouping	30-Acre Farms	40-Acre Farms		60-Acre Farms		80-Acre Farms		100-Acre Farms
	1-4 Cows 50-300 Hens	3-6 Cows 75-200 Hens	3-7 Cows 100-300 Hens	3-7 Cows 60-150 Hens	4-9 Cows 100-300 Hens	5-8 Cows 50-200 Hens	8-11 Cows 100-200 Hens	8-14 Cows 50-150 Hens
Relative frequency of type in per cent. . .	87	45	32	36	54	44	47	71
All Crops.....	<i>Acres</i> 19	<i>Acres</i> 21	<i>Acres</i> 28	<i>Acres</i> 38	<i>Acres</i> 46	<i>Acres</i> 50	<i>Acres</i> 57	<i>Acres</i> 52
Corn.....	4	6	10	7	12	9	16	15
Wheat or Rye...	0-5	0-5	4	8	10	10	12	10
Oats.....	0-5	5	4	5	7	10	11	10
Hay.....	5	8	6	15	15	18	15	15
Other Crops ²	1-3	0-4	0-3	0-1	0-2	0-3	0-3	0-2
Pasture.....	6	10	10	20	12	25	20	45
Other Land.....	3	9	2	2	2	4	3	3
Livestock:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Horses.....	2	2	2	2	3	3	3	3
Cows.....	1-4	3-6	3-7	3-7	4-9	5-8	8-11	8-14
Other Cattle....	0-1	1-3	0-3	1-3	2-4	1-5	2-5	3-6
Sows.....	0	0-1	0-1	.....	0-1	.....	0-1	0-2
Poultry.....	50-300	75-200	100-300	60-150	100-300	50-200	100-200	50-150

¹The 20-acre farms represent 6%; the 30-acre farms 12%; the 40-acre farms 23%; the 60-acre farms 14%; the 80-acre farms 10%; and the 100-acre farms 5% of all farms.

²The other crops include largely celery and onions grown on the muck areas.

From a representative township in Ottawa county, the records for 426 farms were used for the purpose of studying typical farming systems for Area 4. In this area, the 40-acre farm is the most common size, comprising about one-fourth of all farms. The 30, 60, and 80-acre farms are next in point of numbers and are found in about the same ratio.

The organizations in this county show a much greater preponderance of both dairy cows and poultry than are found in adjoining counties. Thus, on the 40-acre farms, the most common organization has from 3-6 cows and from 75-200 hens. About 45 per cent of the farmers on the 40-

acre farms follow this organization. There are two other organizations on this same size of farm, each of which is followed by a smaller number of farmers and in which both more or less cows and poultry are found. On one of these typical farms, about 2-4 cows and 50-150 hens are handled and on the other 2-7 cows and 100-300 hens. About 22 per cent of the farmers follow the former and 32 per cent the latter organization. On the other sizes of farms, the most common, as well as the other organizations, may be ascertained from Table 9.

With the exception of the poor sandy area along the western part of the county and the muck area in the south-central part on which celery and onions are grown, these organizations are typical not only for this county but for the portions of Allegan, Kent, and Muskegon included in Area 4. The muck area in Allegan is devoted largely to onions.

Table 10.—Typical farming systems in Area 5, the general dairy farming and cash crops section of south central Michigan, (Eaton county).¹ Special tabulations 1925 census.

Basis of Grouping	40-Acre Farms	80-Acre Farms		100-Acre Farms	120-Acre Farms	160-Acre Farms	200-Acre Farms
	2-5 Cows 3 Acres Beans	2-6 Cows 7 Acres Beans	4-8 Cows 12 Acres Beans	2-6 Cows 11 Acres Beans	0-9 Cows 13 Acres Beans	3-8 Cows 18 Acres Beans	5-10 Cows 20 Acres Beans
Relative frequency of type in per cent	82	42	54	86	77	86	100
	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>
All Crops	22	38	61	61	73	94	117
Corn	5	7	12	12	15	15	25
Wheat	2	5	10	8	11	16	12
Oats and Barley	5	7	12	10	12	15	25
Beans	3	7	12	11	13	18	20
Hay	7	12	15	20	22	30	35
Pasture	9	25	10	30	35	45	55
Other Land	5	9	8	8	12	16	25
Livestock:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Horses	2	3	3	3	3	4 ⁴	4 ⁴
Cows	2-5	2-6	4-8	2-6	0-9	3-8	5-10
Other Cattle	0-2	0-3	0-4	0-3	0-5	0-4	0-10
Sheep	0-8	0-30	0-30	0-30	30-50 ²	30-50 ³	60-70
Sows	0	0-1	0-1	0-2	0-3	0-2	0-3
Poultry	50-75	50-75	50-100	50-150	50-125	75-100	50-100

¹The 40-acre farms represent 12%; the 80-acre farms 35%; the 100-acre farms 7%; the 120-acre farms 8%; the 160-acre farms 11%; the 200-acre farms 4% of all farms.

²20% of all farms have no sheep.

³A few have as high as 150 sheep.

⁴1/3 farms have tractors.

General Farming Area—5

This area is one of the largest areas in the state in which a similar type of farming predominates. It comprises much of south central Michigan. This area in many respects is similar to Area 8. The major cash crops are beans and wheat. The major livestock enterprise is the dairy which is supplemented by sheep, hogs and poultry.

The principal markets are Lansing, Flint, Detroit, Jackson, Grand Rapids, and Battle Creek. These nearby markets favor the dairy over other livestock enterprises. Most of the dairy products are sold as whole milk. In 1924, corn occupied from 11 to 13 per cent, wheat from 6 to 11 per cent, oats and barley from 8 to 12 per cent, beans from 5 to 7 per cent, and hay from 18 to 22 per cent of the improved land in farms.

Prices of farms range from \$80 to \$100 per acre (March 1926 Crop Report). The soils show much variation but are mostly loams and sandy loams of medium to high fertility. The topography varies from gently rolling to hilly. Thus, on many farms will be found some untillable permanent pasture for the dairy and sheep enterprises which are common in these counties. The trend has been to increase the dairy, poultry, and alfalfa enterprises and, to a lesser extent, the bean and wheat acreages since 1910.

Table 11.—Typical farming systems in Area 5, the general dairy farming and cash crops section of south central Michigan (Livingston county).¹ Special tabulations of the 1925 census.

Basis of Grouping	80-Acre Farms		120-Acre Farms		140-Acre Farms		200-Acre Farms	
	2-4 Cows 0-7 Acres Beans	3-7 Cows 0-7 Acres Beans	3-6 Cows 8 Acres Beans	4-10 Cows 8 Acres Beans	2-3 Cows 12 Acres Beans	4-7 Cows 8 Acres Beans	2-7 Cows 11 Acres Beans	5-10 Cows 10 Acres Beans
Relative frequency of type in per cent	42	46	27	62	23	45	36	46
All Crops	<i>Acres</i> 47	<i>Acres</i> 49	<i>Acres</i> 70	<i>Acres</i> 75	<i>Acres</i> 71	<i>Acres</i> 82	<i>Acres</i> 105	<i>Acres</i> 122
Corn	7	13	8	13	7	14	14	24
Wheat	7	5	9	10	10	11	20	20
Rye			0-5	3	0-5	3	0	
Oats and Barley	8	12	13	14	10	16	20	24
Hay	18	17	25	25	30	30	40	44
Beans	7	6-7	8	8	12	8	11	10
Other Crops			5	2				
Pasture	25	25	35	30	40	45	55	70
Other Land	5	5	8	12	25	12	25	8
Livestock:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Horses	3	3	4	4	3	4	5	5
Cows	2-4	3-7	3-6	4-10	2-3	4-7	2-7	5-10
Other Cattle	0-2	1-4	1-4	3-8	1-2	2-4	2-5	4-5
Sheep	0-20	0-20		0-25	0-25	20-40	0-40	60-175
Sows	0-1	0-1	0-1	0-1		0-1	0-2	
Poultry	50-100	75-125	50-100	75-125	50	50-100	75	100-150

¹The 40-acre farms represent 7%; the 60-acre farms 9%; the 80-acre farms 17%; the 120-acre farms 23%; the 140-acre farms 21%; and the 200-acre farms 7% of all farms. The other farms either were too small or too scattered to group.

Data on 1173 farms were taken in six representative townships in Jackson, Livingston, Shiawassee, Eaton, Kent, and Ionia counties and were used as a basis for determining the typical farming systems. The figures for Eaton and Livingston counties are shown in Tables 10 and 11. In Kent, Eaton, and Shiawassee, the 80-acre farm is the most common size. In Jackson the 60-acre farm is the most common size, in Livingston the 120, while in Ionia the 80 and 120-acre farms are of equal importance.

In Jackson county, the most common organization on the 120-acre farms has 13 acres of corn, 8 acres of wheat or rye, 12 acres of oats or barley, 20 acres of hay, 2 acres of potatoes, 4 acres of beans, 35 acres of pasture, and 25 acres of other land. There are also from 3-7 cows, 1-4 other cattle, no sheep, 0-1 sows and 50-100 hens. Approximately one-half of the farmers on this size of farm follow this organization. Another 23 per cent of the farmers follow an organization which has from 4-10 dairy cows and 9 acres more corn and 10 acres more oats.

In Eaton county there are found, on the whole, less pasture, more

wheat and beans, and more sheep and dairy cows. Thus, on the 80-acre farm, about 54 per cent of the farmers have an organization in which 12 acres of beans and 4-8 cows are most common. On this same size of farm, another organization followed by about 40 per cent of the farmers is found with 2-6 cows and only 7 acres of beans. On the other sizes of farms, only the most common organization is shown. It will be noted that a range is given for all the livestock except horses in all of these organizations. In all the areas there was found to be a range in the livestock even on farms with about the same cropping systems. The range shown here is not the actual but the effective range. That is, most of the farms had either the number of livestock shown in the first figure or the second. This was the most usual thing. A few farms possibly had less or more livestock than shown here but they were extremes and were disregarded. Table 10.

In Livingston county, there are two common organizations found on the 120-acre farms, which are the most common size. The chief difference between them is in the number of dairy cows and in the acreage of corn. The most common of the two was 4-10 cows and 13 acres of corn, the other 3-6 cows and only 8 acres of corn. About 62 per cent of the farmers follow the first one and 27 per cent the latter. On the 80, 140 and 200-acre farms much the same situation is found. There are two organizations, one of which has more corn and dairy cows than the other. The other crops and livestock vary but little. See Table 11.

In Shiawassee county, about the same type of organizations are found except that there are more sheep. There is considerable sheep feeding done in this area. A number of farms showed as many as 500-600 head, they represent the specialized feeders which comprise a very small percentage of all the farmers in the area. Some of these farmers feed more than one lot per year and the census data taken on January 1, will show only those on feed at that time. The most common organization on 160-acre farms has 10 acres of corn, 25 acres of wheat, 20 of oats and barley, 22 of beans, 30 of hay, 40 of pasture and 10 acres of other land; 4 horses, 4-6 cows, 0-3 other cattle, 0-70 sheep, 0-2 sows and 50-200 hens.

In Ionia county, there are found fewer dairy cows and more beef cattle, hogs, and sheep than are found in the other organizations discussed in the other counties in this area. There also is more pasture. The northern part of this county becomes more broken and is better suited for pasture than for crops. The amounts and proportions of the crops grown is not very different from that in the other adjacent counties.

The organizations in southeastern Kent county are very similar to those in the other counties in Area 5 except that there are not quite so many beans. However, there are more dairy cows. The proximity of Grand Rapids has probably been influential in causing more cows to be kept. This county borders on the potato area to the north. In fact, the northern part of Kent is in the potato area.

Dairy and Potato Area—6

This specialized dairy and potato region comprises most of Oakland and Lapeer counties. Dairying is the dominant enterprise in this area and there is enough difference in the other crops and in the nature of the soil and topography to warrant putting these counties into a separate

area. Poultry is more important in the southern portions. Potatoes are quite important here and this also distinguishes this area from the other areas in this section of the state. There is more variability in the farm organizations of this area than is found in most other areas. In 1924, about 11 per cent of the improved land was in corn, 11 per cent in oats and barley, 4 to 5 per cent in beans, 3 per cent in potatoes, 19 to 25 per cent in hay, and 35 per cent in pasture. Much fruit is produced in the south central portion of Oakland and beans are important in Lapeer and Tuscola counties. The typical farming systems in this area was found from a study of 182 farms in Lapeer county.

Table 12.—Typical farming systems in Area 6, the dairy and potato area of southeastern Michigan (Lapeer county).¹ Special tabulation 1925 census.

Basis of Grouping	30-Acre Farms	40-Acre Farms	80-Acre Farms		100-Acre Farms	160-Acre Farms
	0-3 Cows 3 Acres Potatoes	1-4 Cows 4 Acres Potatoes	3-8 Cows 5 Acres Potatoes	3-10 Cows 5 Acres Potatoes	6-10 Cows 4 Acres Potatoes	6-20 Cows 7-10 Acres Potatoes
Relative frequency of type in per cent	75	68	71	22	81	74
	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>
All Crops	16	23	48	50	60	92
Corn	4	5	5	10	10	15
Wheat and Rye ²	0	0	8	5	10	15
Oats and Barley	4	6	10	10	13	17
Hay	5	8	15	15	15	30
Beans	0	0	5	5	8	7
Potatoes	3	4	5	5	4	7-10
Pasture	10	14	25	25	30	55
Other Land	2	3	6	5	9	10
Livestock:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Horses	2	3	3	3	3	4
Cows	0-3	1-4	3-8	3-10	6-10	6-20
Other Cattle	0	0-1	1-4	1-4	1-3	3-6
Sows	0	0	0-1	0-1	0-2	0-2
Poultry	50-75	50-125	75-125	75-125	75-125	40-100

¹The 30-acre farms represent 7%; the 40-acre farms 14%; the 80-acre farms 36%; the 100-acre farms 18%; and the 160-acre farms 13% of all farms.

²Mostly wheat.

Pontiac, Detroit, Flint, and other cities in the area provide nearby markets for farm produce. These nearby markets and the generally lighter soils are the main factors influencing the type of farming in this area. Farm prices range from \$80 to \$100 per acre (March 1926 Crop Report). The surface of the area is gently rolling to hilly. There are many lakes and summer resorts in Oakland county. The soils range from sands to sandy loams of low to medium fertility.

The 40, 80, 100, and 160-acre farms are the dominant sizes of farms, the 80-acre farms being the most common. The most common organization on this size of farm has 3-8 cows and about 5 acres of potatoes, about 71 per cent of the other farmers follow this organization. The extent of the other enterprises may be seen in Table 12. About 20 per cent of the other farmers follow an organization having the same amount of potatoes but with more dairy cows and more corn. The nature of the farming systems on the other sizes of farms may be ascertained from Table 12.

Hay and Cattle Area—7

This area includes the northern half of St. Clair, all of Sanilac, and most of Huron county. Beef and dairy cattle and hay and oats predominate. In Huron and northern Sanilac, beans, wheat, and chicory are important crops. There are but few sheep and hogs because of the small acreage of corn. Much of the milk is sold in Detroit although in the northern part of the area dairy products are marketed mostly as cream. In 1924, corn occupied about 5 per cent of the improved land, wheat and rye 6 to 9 per cent, oats and barley 12 to 15, beans 7 to 17, and hay and pasture about 30 per cent each.

Topography is level for the most part. The soils vary from sandy loams with a rolling surface to clays which are level. Adequate drainage is a limiting factor on the level clay soils which are likely to be wet. The growing season is somewhat shorter than in the adjoining areas to the west and this combined with the late seeding on the heavy, poorly drained soils offers less favorable conditions for the production of corn, hogs, and sheep. Thus, the production of hay and pasture are favored. Markets are more distant than for most areas in the southern part of the state. Farming tends to be extensive rather than intensive, particularly in the northern portions where there is much pasture land. Farm land prices range from \$70 to \$80 an acre in 1926 (March Crop Report).

Table 13.—Typical farming systems in Area 7, the hay and cattle area of southeastern Michigan (Sanilac county).¹ Special tabulation 1925 census.

Basis of Grouping	40-Acre Farms	80-Acre Farms	120-Acre Farms
	0-4 Cows 5 Acres Beans	4-9 Cows 10 Acres Beans or Sugar Beets	5-12 Cows 10 Acres Beans or Sugar Beets
Relative frequency of type in per cent.....	89	84	56
	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>
All Crops.....	28	56	75
Corn.....	2	3	10
Wheat.....	4	3-10	3
Oats and Barley.....	7	13	17
Hay.....	10	24	35
Beans or Sugar Beets.....	5	10	10
Pasture.....	10	20	40
Other Land.....	2	3	4
Livestock:	<i>Number</i>	<i>Number</i>	<i>Number</i>
Horses.....	2	3	4
Cows.....	0-4	4-9	5-12
Other Cattle.....	0-2	1-4	2-6
Sows.....	0	0	0
Poultry.....	30-60	40-80	50-80

¹The 40-acre farms represent 13%; the 80-acre farms 37%; and the 120-acre farms 17% of all farms. The remaining farms were too scattered to group.

This has been one of the major surplus hay areas of the state. Since 1920, the price of hay has been low, and many sections depending on this crop for much of their farm income have felt the low prices very keenly. The necessary transition to a farm organization involving more livestock is taking place slowly.

A representative township was selected in Sanilac as typical of the farming systems throughout the area. These farming systems are shown

in Table 13. Dairy cows are still the important enterprise but in the northern portion of the area, particularly, butter-fat production rather than whole milk becomes dominant. On the 80-acre farms, which comprise 37 per cent of the farms of all sizes, the most common organization followed is one having 3 acres of corn, 3-10 acres of wheat, 13 acres of oats and barley, 24 acres of hay, and 10 acres of either beans or sugar beets. In addition, there are 4-9 cows, 1-4 other cattle, and 40-80 hens. About 85 per cent of the farmers on this size of farm follow this organization. The nature of the organizations on the other sizes of farms may be obtained directly from Table 13.

Table 14.—Typical farming systems in Area 8, the bean, sugar beet, and dairy area of eastern central Michigan (Saginaw, Gratiot and Tuscola counties).¹ Special tabulations 1925 census.

Basis of Grouping	60-Acre Farms	80-Acre Farms				120-Acre Farms		160-Acre Farms	
	5-11 Acres Beans 0-4 Acres Sugar Beets	3-8 Acres Beans 4-12 Acres Sugar Beets	13-18 Acres Beans 4-12 Acres Sugar Beets	25-34 Acres Beans 0-10 Acres Sugar Beets	9-15 Acres Beans 3-10 Acres Sugar Beets	16-25 Acres Beans 0-7 Acres Sugar Beets	10-23 Acres Beans 9 Acres Sugar Beets	25-45 Acres Beans 0-20 Acres Sugar Beets	
Relative frequency of type in per cent . . .	37	17	26	8	26	37	40	40	
All Crops	<i>Acres</i> 44	<i>Acres</i> 48	<i>Acres</i> 62	<i>Acres</i> 68	<i>Acres</i> 74	<i>Acres</i> 77	<i>Acres</i> 89	<i>Acres</i> 125	
Corn	7	10	10	8	11	12	16	12	
Wheat	6	8	7	4	12	12	0-15	25	
Oats or Barley . .	10	10	10	10	15	14	20	25	
Hay	10	10	12	12	14	15	20	23	
Beans	8	5	15	29	15	21	17	30	
Sugar Beets	0-4	0-10	4-12	0-10	3-10	0-7	9	0-20	
Pasture	12	25	13	10	35	30	60	30	
Other Land	4	7	5	3	10	10	8	5	
Livestock:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	
Horses	3	3	3	3	4 ²	4 ²	4 ²	4 ²	
Cows	3-7	3-7	3-8	2-5	4-8	4-10	3-10	6-8	
Other Cattle	0-2	0-2	0-3	1-3	1-2	1-4	0-4	0-3	
Sheep	0-10	0-10	0-20	0-20	0-25	0-20	0-40	0-1	
Sows	1-3	1-2	2-3	0-2	0-2	1-3	1-6	0-2	
Poultry	75-100	50-100	50-100	40-75	75-100	50-125	50-150	50-100	

¹The 25-acre farms represent 5%; the 40-acre farms 18%; the 60-acre farms 11%; the 80-acre farms 31%; the 100-acre farms 6%; the 120-acre farms 9%; the 140-acre farms 5%; and the 160-acre farms 5% of all farms.

²Tractor.

Beans, Sugar Beets and Dairy Area—8

This area commonly known as the Saginaw Valley is much like Area 5 except that it is more level, somewhat more fertile and produces more beans and sugar beets. It is the important bean and sugar beet region of the state. These crop enterprises are centered here because of the large area of fertile soil and the favorable growing season. Wheat and chicory are other cash crops.

The major markets, Saginaw, Bay City, Flint, and Detroit favor the development of the dairy enterprise. Dairy products are sold as whole milk. Truck farming is well developed in local areas. The soils vary from sands to loams and clays. Most of the soils are of medium to high

fertility. The surface of the clays and sands are level and require artificial drainage. The loams are level to rolling in topography. Farm prices range from \$80 to \$100 an acre according to the March 1926 Crop Report. In 1924, corn occupied from 10 to 13 per cent of the improved land, wheat 6 to 8 per cent, oats and barley 13 per cent, sugar beets 3 to 5 per cent, beans 13 to 17 per cent, hay from 18 to 20 per cent, and pasture from 27 to 31 per cent. Since 1910, the number of dairy cows and poultry have increased, the number of swine have remained about the same, and the number of sheep and other cattle have declined.

Approximately 600 records were taken from three representative townships in Saginaw, Gratiot, and Tuscola counties. Since the organizations in these three townships were so similar, typical farming systems from the combined data were set up for the different sizes of farms as shown in Table 14.

On the 80-acre farms, which are the most common in size, the most common organization has from 13-18 acres of beans and from 4-12 acres of sugar beets. About one-fourth of the farmers on the 80-acre farms follow this organization. About as many farmers follow an organization which has from 9-12 acres of beans and from 3-10 acres of sugar beets. Thus, approximately 50 per cent of the farmers on this size of farm follow these two organizations. The other 50 per cent follow organizations having both more and less beans and sugar beets. Ten per cent of them follow an organization with no beans and from 0-10 acres of sugar beets, 17 per cent with 3-8 acres of beans and from 0-10 acres of beets, 13 per cent with 19-24 acres of beans and 0-10 acres of sugar beets, and the other 8 per cent follow an organization having 24-38 acres of beans and 0-10 acres of sugar beets. On the other size of farms, not quite so wide variations are found as will be seen in Table 14.

Cattle, Sheep, and Forage Area—9

Hay, cattle, and sheep are the dominating farm enterprises in this region. Some beans and sugar beets are produced. In 1924, the per cent of improved land in corn in the different counties ranged from 4 to 10, in oats and barley 12 per cent, in hay 32 to 40 per cent and in pasture from 40 to 50 per cent. Farming is usually less intensive than in the areas to the south. Larger units are necessary in order to farm much of the land successfully. A number of large farms or ranches are located here.

This area to the north of Area 8 is characterized in general by lighter soils of medium to low fertility and a somewhat shorter growing season. Much of the land is not well adapted to farming at the present time on account of the light soils of low fertility. The surface is level to rolling. The markets are more distant than is the case with the counties to the south. The price of farms ranged from \$30 to \$60 per acre in 1926 (March Crop Report). From 30 to 50 per cent of the area is in farms, and 33 to 45 per cent of the land in farms is in crops.

Records were taken from a representative area in Midland county and used as a basis for determination of the typical farming systems. The 40, 80, 120, 160, and 240-acre farms are the prevailing sizes of farms, the 80-acre farm being the most common in size. There are two organizations on the 80-acre farms which are commonly followed. One of

these has only 15 acres in crops, 3 acres of which are in corn, 3 acres in oats, 5 acres in hay, 1 acre in potatoes, 2 acres in beans, 18 acres in pasture, and 45 acres of other land. There are, in addition, 2 horses, 1-2 cows, 0-2 other cattle, and 20-50 hens. The other organization has about 34 acres in crops with more hay and less waste land and with more cows. This area is close enough to the bean area to the south, and the potato area to the west, to have a small amount of each crop.

Representative townships were also taken in Arenac, Iosco, and Gladwin counties and the organizations of all the farms therein were used as a basis for the typical farming systems shown in Table 15. The agriculture in general and the organization of the farms in this area are much better than that just presented for Midland county. The 80-acre farm is still the most common in size, but the 40, 60, 120, and 200-acre farms are also found. On the 80-acre farms there are three fairly distinct organizations. The most common of these has from 4-8 cows. The other two have either 6-8 or 7-9 cows, as will be seen in the table. The organizations prevailing on the other sizes of farms may be ascertained by referring to Table 15.

Table 15.—Typical farming systems in Area 9, east central Michigan (Arenac, Iosco and Gladwin counties).¹ Special tabulations 1925 census.

Basis of Grouping	60-Acre Farms	80-Acre Farms		120-Acre Farms		160-Acre Farms		200-Acre Farms
	4-8 Cows	4-8 Cows	6-8 Cows	5-9 Cows	7-10 Cows	6-10 Cows	7-11 Cows	8-15 Cows
Relative frequency of type in per cent. . .	83	31	28	30	40	50	50	78
	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>
All Crops	32	37	43	42	55	47	89	83
Corn	7	6	7	6	9	8	10	10
Wheat and Rye		0-8	0-5	0-3	0-6	0-6	10	0-12
Oats	8	9	8	10	12	10	16	18
Hay	8	10	17	14	23	18	40	35
Potatoes	$\frac{1}{2}$	1	1	$\frac{1}{2}$	1	1	1-2	2
Beans	$8\frac{1}{2}$	7	8 ³	10	0-15	3-12 ³	10	12 ³
Pasture	24	38	30	70	55	90	55	100
Other Land	4	5	4	7	6	20	14	15
	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Livestock	3	3	3	3	4	4	4	5
Horses								
Cows	4-8	4-8	6-8	5-9	7-10	6-10	7-11	8-15
Other Cattle	2-4	1-3	2-4	1-5	2-5	3-6	3-6	3-10
Sows	0-1				0-1		0-1	0-1
Poultry	25-60	20-50	40-75	25-50	40-75	20-40	40-75	30-50

¹The 40-acre farms represent 22%; the 60-acre farms 6%; the 80-acre farms 31%; the 120-acre farms 15%; the 160-acre farms 10%; and the 200-acre farms 6% of all farms.

³Sugar Beets or Beans.

Forage and Forestry Area—10

This area has the lowest percentage of land in farms of any region of the Lower Peninsula largely on account of its light soils of low fertility and the shorter growing season. The agriculture is limited and based mostly on dairy cattle, hay and pasture. Some sheep ranches are in the area. In 1925, there were but 238 farms in Roscommon, 188 in Crawford, and 214 in Oscoda counties. About 10 per cent of the land area in these counties was in farms. The portions of Newaygo and Lake counties in this area have longer growing seasons, are nearer to markets, and have a

somewhat better agriculture than in the first three counties listed. The soils, however, are similar and are mostly sands or light sandy loams, acid in reaction, low in humus, and low in moisture. The area consists mainly of level plains but it is in part hilly. There are many lakes and streams which provide excellent recreational facilities.

In the detailed study of the farming systems in this area, representative townships were taken in Crawford, Lake, and Newaygo counties. Because of similarity in organization the records in Crawford and Lake were combined and used as a basis for determining the typical farming systems shown in Table 16. The organizations in this table reflect the poor character of the agriculture in the area. Most of the land in farms is either in pasture or waste land. The farm income for the most part is derived from the sale of potatoes, some cream and cattle and poultry products.

Table 16.—Typical farming systems in Area 10, the light sandy region of north central Michigan (Crawford and Lake counties).¹ Special tabulations 1925 census.

Basis of Grouping	40-Acre Farms	80-Acre Farms	120-Acre Farms	160-Acre Farms	240-Acre Farms
	2-5 Cows Most Common	3-6 Cows Most Common	2-8 Cows Most Common	2-7 Cows Most Common	1-6 Cows Most Common
Relative frequency of type in per cent	69	83	83	64	67
	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>
All Crops	15	19	13	20	9
Corn	3	4	0-4	5	3
Rye or Wheat	0-4	4	.....	4	.....
Oats	0-2	3	.....	.....	.....
Hay	0-10	6	0-10	6	5
Potatoes	1	1-2	1	1	0-1
Small Grain cut for Hay	0-5	.....	4	.....	.....
Other Crops	0-1	0-1	0-2	0-8	0-1
Pasture	18	.....	50	135	230
Other Land	7	60	55	.....	.....
Livestock:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Horses	2	2	2	2	3
Cows	2-5	3-6	2-8	2-7	1-6
Other Cattle	0-3	1-5	0-5	1-3	1-3
Poultry	15-21	10-30	20-50	20-50	15-30

¹The 40-acre farms represent 30%; the 80-acre farms 14%; the 120-acre farms 14%; the 160-acre farms 13%; and the 240-acre farms 14% of all farms.

The Newaygo county area is somewhat better, and a higher percentage of the land in farms is in crops or pasture. In this area, the 40 and 80-acre farms are found in about the same ratio, each comprising between one-fifth and one-fourth of all the farms.

The Cattle and Forage Area—13

The predominating type of farming in this area is hay and pasture combined with cattle, mostly dairy cows, and some sheep. Very little corn is grown because of the short growing season. Oats do well and potatoes are an important cash crop although not to the extent found in Area 12 to the west. Dairy products are marketed mostly as cream on a butter fat basis. From 22 to 39 per cent of the land was in farms in 1925 and from 30 to 40 per cent of the farm land was classed as crop land that year. Hay occupied 35 to 45 per cent of the improved land, oats

from 11 to 15 per cent, potatoes from 2 to 3 per cent and pasture from 40 to 50 per cent. The most common size of farm is 80 acres. Most of the other farms are 40, 120, 160, and 240 acres in size.

A large proportion of the land is nearly level. In some places the soils are quite stony and in places limestone bed rock lies at a depth of a few inches to a few feet. Some loams and sandy loams of relatively high fertility are also located in this area. This region has the disadvantage of the northern location and greater distances from market. The short growing season is not favorable for corn production. The topography varies from level to gently rolling to hilly. The price of farms in 1926 ranged from \$40 to \$60 per acre. (March Crop Report.)

In this area, which includes the five northeastern counties of the Lower Peninsula, representative townships were taken in Alpena and Montmorency counties and all the farms in the two counties were combined and used as a basis for determining the typical farming systems shown in Table 17.

Table 17.—Typical farming systems in Area 13, the cattle and forage section of northeastern Michigan (Montmorency and Alpena counties).¹ Special tabulations 1925 census.

Basis of Grouping	40-Acre Farms	80-Acre Farms		120-Acre Farms		160-Acre Farms		240-Acre Farms
	14 Acres Hay 1-3 Cows	10 Acres Hay 2-5 Cows	18 Acres Hay 2-6 Cows	12 Acres Hay 4-6 Cows	25 Acres Hay 5-6 Cows	16 Acres Hay 2-5 Cows	30 Acres Hay 2-5 Cows	30 Acres Hay 4-8 Cows
Relative frequency of type in per cent . .	53	36	47	50	47	40	45	70
	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>
All Crops	19	19	29	27	43	25	59	55
Corn	0-2	0-3	0-2	0-5	3	0	0-6	0-4
Oats and Barley . .	0-6	5	8	10	10	8	20	20
Hay	14	10	18	12	25	16	30	30
Potatoes	$\frac{1}{2}$	1	1-3	1-2	1-3	1	2-4	1-3
Other Crops	$\frac{1}{2}$	0-3	0-1	0-2	0-5	.....	0-6	0-4
Pasture	17	50	45	43	40	45	45	75
Other Land	4	10	6	50	35	90	50	110
Livestock:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Horses	2	2	2	3	3	2	2	4
Cows ²	1-3	2-5	2-6	4-6	5-6	2-5	2-5	4-8
Other Cattle ² . . .	1-2	0-4	2-5	2-4	2-5	0-3	1-5	2-5
Poultry	10-30	25-50	20-50	25-50	30-50	25-50	25-30	30-50

¹The 40-acre farms represent 24%; the 80-acre farms 38%; the 120-acre farms 17%; the 160-acre farms 10%; and the 240-acre farms 5% of all farms.

²About 50% of the cattle are beef cattle.

The most common organization on the 80-acre farms has 29 acres in crops, 0 to 2 acres of which are in corn, 8 acres in oats and barley, 18 acres of hay, 1 to 3 acres in potatoes, and 0 to 1 acres in other crops. There are, in addition, 45 acres in pasture and 6 acres in other land. The number of dairy cows varies from 2 to 6 and there are 2 to 5 other cattle and 20 to 50 hens. Hay is by far the most important crop grown. Approximately one-half of the farms follow this organization. There are two other organizations in this same size of farm. One of these has 10 acres of hay and from 2 to 5 cows and the other 35 acres of hay and from 2 to 8 cows. About 35 per cent of the farmers follow the former organization and 15 per cent the latter.

In this area, about 50 per cent of the cattle are reported as beef cattle.

The variations in the organizations and the proportion of the farmers following each, on the other sizes of farms, may be obtained by referring to Table 17

Potatoes and Cattle Areas—11A and 11B

This region is best known as the potato area of the state. Potatoes is the major cash crop and dairy cattle is the major livestock enterprise. It is a butter-fat area. The number of dairy cows has been steadily increasing and replacing beef cattle since 1910. Sheep, hogs, and poultry are of minor importance except on some large farms where large numbers of sheep may be handled under ranch conditions. The major factors determining the type of farming in this area are the lighter, mellow, sandy loam and loam soils and a cool moist growing season favorable to potatoes. In addition there is much rough, rolling land which can best be utilized by sheep and cattle for pasture.

In 11B, from 70 to 80 per cent of the land is in farms, and 45 to 55 per cent of the farm land is in crops. In 1924, about 12 per cent of the improved land was in corn, 12 per cent in oats, 20 to 23 per cent in hay, 6 to 8 per cent in potatoes, 2 to 3 in wheat, 3 to 5 in rye, and 4 to 5 per cent in beans. Compared with Area 11A to the North, this area has a larger percentage of land in farms. In addition a larger part of the crop land is in corn, potatoes, oats, wheat, and rye and less in hay. The price of farms ranged from \$60 to \$85 per acre in 1926 (March Crop Report). In 11A, in 1924, from 40 to 60 per cent of the land was in farms and with 30 to 50 per cent of the farm land in crops. From 8 to 11 per cent of the improved land was in corn, 4 to 11 in oats, 18 to 35 in hay, 3 to 5 in rye and wheat, and 2 to 5 per cent in potatoes. The price of farms ranged from \$30 to \$50 per acre according to the March 1926 Crop Report.

In this important potato area, 11A and 11B, approximately 650 records taken in representative townships of Montcalm, Osceola, Missaukee, Grand Traverse, Charlevoix and Emmet counties were used as a basis for determining the typical farming systems.

Montcalm, in Area 11B, is the most intensive potato county in the state. The farms vary in size from 40 to 160 acres with the 80-acre farm the most common in size. The 120-acre farms are almost as important, however. On the 80-acre farms, there are two organizations which are usually followed. The most common of these, followed by nearly 60 per cent of the farmers, has from 3 to 9 acres of potatoes and from 3 to 5 cows. The other one has from 5 to 10 acres of potatoes and from 4 to 5 cows. The hay acreage is also higher, being 15 acres as against 8 acres in the other organization. About 30 per cent of the 80-acre farmers follow this organization. On the 120 acre farms about 53 per cent have from 4 to 8 acres of potatoes, 8 of corn, 12 of rye or wheat, 8 of oats, 8 of hay and 5 of beans with a total of 47 crop acres. These farms average from 2 to 5 cows. Most of the other 120-acre farms have from 6 to 10 acres of potatoes and 4 to 8 cows with other enterprises remaining about the same except that this group had 59 crop acres.

The farms in Area 11A, in the representative townships in Osceola, Missaukee and Grand Traverse, were combined and used as a basis for the typical farming systems shown in Table 18. These farms varied from 40 to 200 acres in size, the 80-acre farms being most common. On these 80-acre farms, there are found four distinct organizations. The one

Table 18.—Typical farming systems in Areas 11A and 11B, the potato and dairy region of north central Michigan (Osceola, Missaukee and Grand Traverse counties).¹ Special tabulations 1925 census.

Basis of Grouping	60-Acre Farms		80-Acre Farms		120-Acre Farms		160-Acre Farms	200-Acre Farms
	2-7 Acres Potatoes 4-6 Cows	4-7 Acres Potatoes 4-8 Cows	3-7 Acres Potatoes 3-8 Cows	4-7 Acres Potatoes 4-8 Cows	3-8 Acres Potatoes 2-8 Cows	4-8 Acres Potatoes 7-10 Cows	4-10 Acres Potatoes 6-13 Cows	6-11 Acres Potatoes 7-14 Cows
Relative frequency of type in per cent . . .	49	47	21	35	40	37	88	84
All Crops	<i>Acres</i> 31	<i>Acres</i> 41	<i>Acres</i> 33	<i>Acres</i> 40	<i>Acres</i> 40	<i>Acres</i> 51	<i>Acres</i> 66	<i>Acres</i> 65
Corn	6	7	8	8	8	9	8	10
Rye or Wheat	0-5	3	0-5	0-6	0-10	5	0-10	0-20
Oats	8	8	8	8	10	10	11	25
Hay	10	18	10	16	10	20	35	25
Potatoes	2-7	4-7	3-7	4-7	3-8	4-8	4-10	6-11
Other Crops					0-4	0-2		
Pasture	25	15	40	35	65	55	80	120
Other Land	4	4	6	5	12	12	12	15
Livestock:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Horses	2	2	2	2	3	3	4 ²	4 ²
Cows	4-6	4-8	3-8	4-8	2-8	7-10	6-13	7-14
Other Cattle	1-4	2-5	2-5	2-5	2-5	5-8	2-6	0-2
Sows	0-1	0-3	0-1	0-2	0-2	0-2	0-2	0-2
Poultry	50-75	50-100	25-75	40-100	30-75	40-100	40-75	40-100

¹The 40-acre farms represent 13%; the 60-acre farms 13%; the 80-acre farms 28%; the 120-acre farms 20%; the 140-acre farms 4%; the 160-acre farms 7%; and the 200-acre farms 6% of all farms.

²Tractors.

Table 19.—Typical farming systems in Area 11A, the potato and dairy region of northern Michigan (Charlevoix county).¹ Special tabulations 1925 census.

Basis of Grouping	40-Acre Farms	80-Acre Farms		120-Acre Farms		160-Acre Farms
	2 Acres Potatoes 1-3 Cows	2-4 Acres Potatoes 2-5 Cows	1-3 Acres Potatoes 2-5 Cows	2 Acres Potatoes 2-4 Cows	3-7 Acres Potatoes 2-5 Cows	1-4 Acres Potatoes 4-5 Cows
Relative frequency of type in per cent	50	44	42	55	40	87
All Crops	<i>Acres</i> 22	<i>Acres</i> 30	<i>Acres</i> 29	<i>Acres</i> 29	<i>Acres</i> 50	<i>Acres</i> 28
Corn	0	4	0-5	5	8	0-5
Rye or Wheat	0	8	0	0-6	0-8	5
Oats and Barley	0	5	5	0-6	0-6	0-6
Hay	20	10	20	14	28	15
Potatoes	2	2-4	1-3	2	3-7	1-4
Other Crops				2	2	
Pasture	15	35	30	70	50	90
Other Land	2	15	20	21	20	40
Livestock:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Horses	2	2	2	2	2	2
Cows	1-3	2-5	2-5	2-4	2-5	4-5
Other Cattle	0-2	1-3	1-3	1-3	1-3	0-5
Poultry	40-50	30-40	20-40	30-40	30-50	25-60

¹The 40-acre farms represent 13%; the 80-acre farms 40%; the 120-acre farms 22%, and the 160-acre farms 9% of all farms.

which more of the farmers follow than any other has 40 acres in crops, 8 acres of which are in corn, 0 to 6 acres in wheat and rye, 8 acres in oats, 16 acres in hay, and 4 to 7 acres in potatoes. There are, in addition, 40

acres in pasture and other land. The cows vary from 4 to 8, other cattle from 2 to 5, sows from 0 to 2, and poultry from 40 to 100 hens. About 35 per cent of the farmers follow this organization. The other organizations vary from this as follows: One has from 2-6 acres potatoes and from 2-5 cows, another from 3-7 acres potatoes and 3-8 cows, and the last one from 4-8 acres of potatoes and from 6-9 cows. This last organization has considerably more hay than the others, having an acreage as high as 30 as compared with 3, 10, and 16 acres on the others. The variations in the organizations on the other sizes of farms, as well as the proportion of the farmers on each size of farm, may be obtained from Table 18.

The typical farming systems for the representative areas in Charlevoix and Emmet counties in the extreme northern part of the potato area are shown in Table 19. The organizations in these two areas are very similar. The 80-acre farm is the most common in size. There are two organizations commonly followed on the 80-acre farms, one of these has from 1-2 acres of potatoes and from 2-5 cows, and the other has the same number of cows but from 2-4 acres of potatoes. The first organization also has more hay, 20 acres as compared with 10 acres on the latter one. Except for the fruit and radish seed crops the organizations of the farms in these counties are quite similar to those of Antrim county.

Fruit Areas—12A and 12B

This area, known as the fruit belt, borders Lake Michigan. It varies in width from practically nothing up to 35 miles and extends a distance of 300 miles along the lake. Area 12B includes Berrien, VanBuren, and Allegan counties, and 12A includes the counties to the North. The production of apples, pears, grapes, peaches, bush fruits, and strawberries are the major fruit crops in Area 12B. Muskmelons and tomatoes are produced in commercial quantities in Berrien county. A large part of the mint produced in the state comes from this region. There is a considerable amount of general farming along with fruit farming in many sections of this area. In Area 12A, apples and cherries predominate with small acreages of pears. Raspberries are produced in Muskegon, Mason, and Manistee counties. Peaches are found in Oceana. Potatoes are important in the northern counties. Climate and soils are favorable to fruit. Chicago and the large cities in Michigan furnish good markets. In addition, the commercial canneries and pickle factories provide a very important outlet for a number of the cash crops that grow well in this region.

In Table 20 is shown the typical farming systems in Area 12B. These farming systems are based on 237 records taken in a representative township in Berrien county. The most common sizes of farms in Berrien county varies from 10 to 120 acres, and, in VanBuren, from 20 to 140 acres. The 40-acre farm is the most common size in each county. The most common organization on the 40-acre farms in Berrien county has from 450-2400 fruit trees and from 600-3000 grape vines. The tree fruits are apples, peaches, and pears. There is a very wide range in the number of trees and vines on the same size of farms. In Table 20, three figures have been given in each case. For example, there was some farm-

In addition to the areas discussed above, minor fruit areas are found in localized areas in different parts of the state. Two such areas are located in southeastern Michigan. One of these is found in the southern part of Oakland and the other in the northern part of Macomb. Apples predominate in these two districts.

Table 22.—Typical farming systems in Area 12A, the fruit and dairy region of west central Michigan (Oceana county).¹ Special tabulations 1925 census.

Basis of Grouping	20-Acre Farms	40-Acre Farms	60-Acre Farms	80-Acre Farms		120-Acre Farms	160-Acre Farms
	20-500 Apple and Peach Trees 1-2 Cows	50-500 Apple and Peach Trees 1-4 Cows	50-300 Apple and Peach Trees 3-6 Cows	50-500 Apple and Peach Trees 1-4 Cows	50-600 Apple and Peach Trees 3-5 Cows	50-1500 Apple and Peach Trees 2-5 Cows	100-700 Apple and Peach Trees 2-8 Cows
Relative frequency of type in per cent	100	58	92	38	50	85	79
	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>
All Crops.....	16	26	28	20	40	50	65
Corn.....	0-4	5	5	0-5	6	7	9
Rye or Wheat.....		0-6	0-5		4	0-6	10
Oats.....	0-3	4	0-6		5	4	6
Hay.....	0-4	6	12		12	14	18
Potatoes.....		1-2	0-3	0-1	1-4	0-5	2-6
Beans.....	0-2	0-6	1-5		4	0-6	4
Pasture.....	0-5	7	20	30	25	40	65
Other Land.....	1	7	12	30	15	30	30
	<i>Trees</i>	<i>Trees</i>	<i>Trees</i>	<i>Trees</i>	<i>Trees</i>	<i>Trees</i>	<i>Trees</i>
Apples.....	30-200-500	50-100-300	50-100-200	50-100-300	50-150-600	50-300-1500	100-200-500 ³
Peaches.....	20-150-300	0-50-500	0-100-300	75-100-500	0-30-300	0-300-500 ²	100-300-700
Pears.....	20-100-500	0-20-150	0-10-50		0-5-100	0-5-50	0-10
Livestock:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Horses.....	2	2	2	2	2	2	3
Cows.....	1-2	1-4	3-6	1-4	3-5	2-5	2-8
Other Cattle.....	0-1	0-2	0-2	0-2	0-3	0-3	1-3
Poultry.....	25-100	40-75	50-75	20-40	30-50	40-60	40-100

¹The 20-acre farms represent 11%; the 40-acre farms 21%; the 60-acre farms 8%; the 80-acre farms 25%; the 120-acre farms 13%; and the 160-acre farms 9% of all farms.

²Some 2000 or more.

³Some 1000 or over.

*Cherry production is important in this area but was not reported in the 1925 census. Consequently cherry trees are not shown.

Cattle, Forage and Potatoes—Area 14

(Upper Peninsula)

The Upper Peninsula includes nearly one-third of the land area of the state. The major developments in agriculture have taken place in the last 35 years. Menominee, with 35 per cent of its land area in farms is most highly developed. Houghton follows with 22 per cent, Chippewa with 20, and Delta with 19 per cent of the land in farms. From 4 to 11 per cent of the land area of the remaining counties is in farms. Dairy cattle, potatoes, hay, pasture and oats are the major agricultural enterprises. There are very few hogs or sheep in the region. Poultry is found on most every farm.

In Menominee, Dickinson, and Delta counties, the agricultural soils are mainly loams and fine sands of medium to high fertility and are, in part, wet. The surface varies from level to rolling. In 1925, from 5 to 7 per cent of the improved land was in corn, 12 in oats, 4 to 5 in potatoes

and 40 to 45 in hay. This is about the only region in the Upper Peninsula where very much corn is grown. Table 24.

In Schoolcraft, Luce, and part of Mackinac counties from 4 to 7 per cent of the land is in farms and most of this development is below the dotted line shown on the type-of-farming map, Fig. 27, page 48. The soils of the northern portion of the area are mainly sands and peats. The soils below the dotted line are mostly sandy loams and loams. The surface is mainly rolling to hilly. In 1925, 11 per cent of the improved

Table 23.—Typical farming systems in Area 12A, the fruit, potato, and dairy region of northwestern Michigan (Leelanau county).¹ Special tabulations 1925 census.

Basis of Grouping	20-Acre Farms	40-Acre Farms	60-Acre Farms	80-Acre Farms	120-Acre Farms	160-Acre Farms	200-Acre Farms
	1-200 Apple Trees 0-1 Cows	50-300 Apple Trees 1-3 Cows	50-150 Apple Trees 2-3 Cows	50-200 Apple Trees 3-6 Cows	50-500 Apple Trees 3-10 Cows	200-1500 Apple Trees 5-10 Cows	200-1200 Apple Trees 6-12 Cows
Relative frequency of type in per cent	83	89	83	79	89	86	75
	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>
All Crops	6	25	25	42	60	65	85
Corn	0-4	5	8	8-10	10	13	18
Rye or Wheat						5	10
Hay	0-6	10	8	15	18	25	25
Oats		0-4	0-4	6	10	10	12
Potatoes	0-1	1-3	3	3-10	3-10	2-6	5-12
Pasture	10	10	25	30	35	75	70
Other Land	4	5	10	8	25	20	45
	<i>Trees</i>	<i>Trees</i>	<i>Trees</i>	<i>Trees</i>	<i>Trees</i>	<i>Trees</i>	<i>Trees</i>
Apple Trees ²	100-200	50-300	50-150	50-200	50-500	200-1500	200-1200
Pear Trees		0-200	0-50		0-50	10-30	
	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Livestock:							
Horses	1	2	2	3	3	3	3
Cows	0-1	1-3	2-3	3-6	3-10	5-10	6-12
Other Cattle		0-1	0-1	1-3	2-5	3-6	3-6
Sows			0-1	0-2	0-2	0-1	0-2
Poultry	0-40	20-40	50-70	40-60	40-80	40-100	35-100

¹The 20-acre farms represent 14%; the 40-acre farms 15%; the 60-acre farms 14%; the 80-acre farms 19%; the 120-acre farms 14%; the 160-acre farms 11%; and the 200-acre farms 6% of all farms.

²Cherry trees are quite important in this area but were not reported in 1925 census. Consequently cherry trees are not shown.

land was in oats, 40 per cent in hay and from 3 to 4 per cent in potatoes.

In the portions of Chippewa and Mackinac counties enclosed within the dotted lines, shown on type-of-farming map, Fig. 26, the soils are mostly clays and clay loams of medium to high fertility, and are, in part, wet. The surface is level for the most part. This was formerly one of the major hay areas in the state. Because of low hay prices, the farm organization is being modified to include more livestock and to include flax and peas. In 1925, about 55 to 60 per cent of the improved land was in hay, 2 in wheat, and 2 per cent in potatoes.

Ontonagon, Houghton, and portions of Baraga counties constitute a heavy soil area similar to the Chippewa area. Soils are mainly loams to clays, and the surface is level to rolling. In 1925, about 10 per cent of the improved land was in oats, 60 to 70 per cent in hay, 3 to 4 in wheat and rye, and 3 per cent in potatoes. The trend in numbers of dairy cattle and poultry is upward. The mining districts in Calumet and

Table 24.—Typical farming systems of the south central part of the Upper Peninsula, Area 14 (Menominee county).¹ Special tabulations 1925 census

Basis of Grouping	40-Acre Farms	60-Acre Farms	80-Acre Farms		120-Acre Farms		160-Acre Farms
	2-8 Acres Hay 3-6 Cows	4-20 Acres Hay 2-5 Cows	2-9 Acres Hay 3-8 Cows	10-26 Acres Hay 4-8 Cows	7-14 Acres Hay 7-9 Cows	15-32 Acres Hay 6-12 Cows	10-30 Acres Hay 7-14 Cows
Relative frequency of type in per cent	96	67	51	43	54	42	76
	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>
All Crops	11	19	15	22	22	40	41
Corn	2	3	2	3	3	3	4
Rye or Wheat					0-5		3
Oats and Barley	2	0-5	0-6	4	4	10	8
Hay	5	12	6	18	10	22	20
Potatoes	1-2	1-3	1	1-3	1-4	1-4	2-5
Sugar Beets					0-1		0-2
Small Grain cut for Hay	0-2		3			0-4	0-4
Pasture	20	10	25	35	45	30	65
Other Land	8	30	40	15	50	50	50
Livestock:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Horses	2	2	2	2	2	2	3
Cows	3-6	2-5	3-8	4-8	7-9	6-12	7-14
Other Cattle	1-3	1-3	0-3	0-4	1-3	2-5	3-5
Sows					0-1	0-1	
Poultry	20-40	10-30	30-50	30-60	20-50	20-50	30-50

¹The 40-acre farms represent 23%; the 60-acre farms 6%; the 80-acre farms 32%; the 120-acre farms 18%; and the 160-acre farms 12% of all farms.

Houghton have furnished markets which aided considerably in the agricultural development of this region. (Table 25.)

In the area which includes Gogebic, Iron, Marquette, and portions of Dickinson, Delta, and Alger counties there is a great variety of physical conditions insofar as soils, topography, and length of growing season

Table 25.—Typical farming systems in the northwestern part of the Upper Peninsula, Area 14, (Ontonagon, Marquette and Iron counties).¹ Special tabulations 1925 census.

Basis of Grouping	40-Acre Farms		60-Acre Farms	80-Acre Farms		120-Acre Farms	160-Acre Farms
	10 Acres Hay 2-7 Cows	17 Acres Hay 3-7 Cows	20 Acres Hay 5-10 Cows	15 Acres Hay 3-7 Cows	32 Acres Hay 5-10 Cows	28 Acres Hay 4-10 Cows	25 Acres Hay 2-5 Cows
Relative frequency of type in per cent . . .	30	32	83	34	37	73	87
	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>
All Crops	14	23	25	20	40	35	30
Rye or Wheat			0-2			0-2	0-2
Oats and Barley	0-3	4	3	4	6	5	0-5
Hay	10	17	20	15	32	28	25
Potatoes	1	1	1	1	1-2	1-2	1
Small Grain cut for Hay	0-3						
Pasture and Other Land	25	17	35	60	40	85	125
Livestock:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Horses	1	2	2	2	2	2	2
Cows	2-7	3-7	5-10	3-7	5-10	4-10	2-5
Other Cattle	2-4	1-4	3-6	2-4	3-7	3-5	1-3
Poultry	25-50	25-50	25-50	25-50	25-75	25-50	25-40

¹The 10-acre farms represent 8%; the 20-acre farms 7%; the 40-acre farms 35%; the 60-acre farms 7%; the 80-acre farms 25%; the 120-acre farms 9%; and the 160-acre farms 5% of all farms.

are concerned. The soils are mostly sandy loams and loams of medium to high fertility. The topography is rolling and a part of the area is excessively stony and hilly. It is largely cut-over and forested land. Elevation varies from 800 to 2000 feet above sea level. Growing season ranges from 80 to 100 days. Around 8 to 10 per cent of the land area was in farms in 1925. In that year, 70 to 75 per cent of the improved land was in hay, 8 in oats, 2 to 4 in rye, and 5 per cent in potatoes.

Records on about 700 farms in seven representative townships were selected in the Upper Peninsula, in Mackinac, Chippewa, Luce, Marquette, Ontonagon, Iron, and Menominee counties, for the purpose of studying in detail the typical farming systems of this region.

Table 26.—Typical farming systems in the northern peninsula, Area 14, Chippewa, Luce and Mackinac counties).¹ Special tabulations 1925 census.

Basis of Grouping	80-Acre Farms		120-Acre Farms		160-Acre Farms		200-Acre Farms
	27-35 Acres Hay	49-65 Acres Hay	40-60 Acres Hay	61-82 Acres Hay	59-80 Acres Hay	81-120 Acres Hay	95-135 Acres Hay
Relative frequency of type in per cent . . .	21	26	29	37	26	37	65
All Crops	<i>Acres</i> 49 1/2	<i>Acres</i> 69 1/2	<i>Acres</i> 80	<i>Acres</i> 99	<i>Acres</i> 94 1/2	<i>Acres</i> 132 1/2	<i>Acres</i> 158
Wheat	0-3	0-4	0-4	0-3	0-3	0-2	0-2
Oats and Barley	12	14	25	25	25	30	35
Hay	32	54	50	70	65	100	120
Potatoes	1	1 1/2	1-2	1	1	0-1	0-1
Other Crops	3	1	2	3	2	2	2
Pasture	25	7	30	18	50	15	30
Other Land	5	3	10	3	15	12	12
Livestock:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Horses	2	2	3	4	3	3	4
Dairy Cows	0-6	0-3	0-6	0-6	0-6	0-5	9-10 ²
Other Dairy Cattle	0-4	0-1	0-4	0-6	0-3	0-3	3-8 ²
Beef Cows	0	0	0	0	1-4	0-5	0
Other Beef Cattle	0	0	0	3-6	3-5	0-6	0
Sheep	0	0	0	0	0-20	0-20	0-40
Sows	0-1	0-1	0-1	0-3	0-2	0-1	1-2
Poultry	25-50	15-30	30-50	25-50	30-50	20-30	40-60

¹The 40-acre farms represent 9%; the 80-acre farms 36%; the 120-acre farms 20% the 160-acre farms 13%; and the 200-acre farms 9% of all farms.

²50% each beef and dairy cattle.

Table 24 shows the typical farming systems found in Menominee county. The farms vary in size from 40 to 160 acres, with the 80-acre farm being the most common in size. On the 80-acre farms, two organizations are of about equal importance from the standpoint of the number of farmers following them. One of these has from 2-9 acres of hay and from 3-8 cows and the other has 10-20 acres of hay and from 4-8 cows. The acreage of pasture and waste land in the first organization is quite high. Most of the farms have from one to four acres of potatoes. On the 120-acre farms, there are likewise two organizations commonly followed. One of these has from 7-14 acres of hay and from 7-9 cows and the other has from 15-32 acres of hay and from 7-14 cows. About 54 per cent of the 120-acre farms follow the first organization and 46 per cent the latter.

The records obtained from the representative townships in Ontonagon, Marquette, and Iron counties were combined and used as a basis for the

typical farming systems shown in Table 25. The farms in these areas vary from 10 to 160 acres in size, with the 40 and 80-acre farms being the most common sizes.

On the 80-acre farms, there are three organizations which are commonly followed. They vary as follows: 4 acres of hay and 2-6 cows, 15 acres of hay and 3-7 cows, and 32 acres of hay and 5-10 cows. Twenty-two per cent of the farmers follow the first one, 34 per cent the second, and 37 per cent the third. The acreage in pasture and other land varies inversely, with the acreage in hay ranging from 70 acres on the first organization, to 60 acres on the second, and 40 acres in the third. Variations similar to these are found on most of the other sizes of farms, (Table 25). There are no hogs and sheep found in these farms.

The third and final area for which typical farming systems are presented is located in Luce, Chippewa, and Mackinac counties. Records were obtained from representative townships in these areas and, since they had similar organizations, were combined and used as a basis for determining the typical farming systems shown in Table 26. The farms vary in size from 40 to 200 acres. The 80-acre farm is the dominant size. There is a considerable range in the organizations on these farms. There are five distinct organizations, each of which is followed by from 14 to 26 per cent of the farmers in the 80-acre farms. Hay is the principal crop. There is one group of farmers with from 5-15 acres of hay, another with from 18-25 acres, a third with from 27-35 acres, a fourth with 39-48 acres, and a fifth with from 49-65 acres. The last organization is the most common.

The same thing is found on the 120, 160, and 200-acre farms. The most common organization is the one that is heaviest in hay. Thus, on the 120-acre farm the most common organization is one having 61-82 acres of hay, on the 160-acre farm hay acreage ranges from 81-120 acres, and on the 200-acre farm from 95-135 acres. Both dairy and beef cattle are found but the dairy cattle predominate. There are also some sheep and hogs, but they are not of great importance.

WAYS IN WHICH THESE TYPICAL FARMING SYSTEMS MAY BE USED

In the remaining pages attention will be centered upon the uses to which these typical farming systems can be put. The discussion will be divided under three heads—the relation of typical farming systems, (1) to long-time plans of farming and agricultural programs, (2) to the application of the agricultural outlook, and (3) to other lines of research work in agricultural economics and farm management.

Relation of the Typical Farming Systems to Long-Time Plans of Farming and Agricultural Programs

Much attention has been given in recent years by research and extension agencies to the development of long-time plans of farming, and to agricultural programs in particular states and local agricultural areas. The aim of these programs has been to bring about better organizations and practices by the rank and file of farmers with the view of making farming more profitable.

If such programs are to be effective they must correctly appraise the

needs of the particular group or groups advised, and, in the light of present and prospective conditions, recommend changes in organizations and practices which will lead to a more profitable adjustment of production to the demands of the market. The diversity in organization of farms in different areas and on the same size of farm in a particular area, as shown in the foregoing tables is evidence enough that the needs of all farmers are not the same. These variations in organizations must be taken into consideration if specific recommendations are to apply. Blanket recommendations for the so-called average farm obviously are likely to be misleading because there is no such average farm as the term is generally used. An average farm may be quite definite if it is representative of a group of farms of the same size and organization, but as usually considered all sizes and types of farms are thrown together and in this sense the average is not typical of the group.

One important reason why farmers have not always acted upon the recommendations of advisory agencies is due to the fact that they felt such recommendations did not apply either to their conditions or their needs. This, for example, is the weakness of all programs which call for a flat decrease in the acreage of some crop or in numbers of a particular class of livestock, because of a prevailing low price. Such recommendations overlook the fact that there are wide variations in the amounts of such enterprises handled both by individual farmers and by typical groups of farmers and that, while it may be decidedly to the advantage of certain ones to make as much of a decrease as recommended, others, differently situated, may profitably increase their production in spite of the low price.

What is needed is a segregation of farms into specific groups on the basis of size in homogeneous type-of-farming areas so that the difficulties and needs of the specific groups can be analyzed and recommendations can be made to apply specifically to them. Type-of-farming studies, such as this, are designed to fill this need and to supply the background of information necessary to give such a picture of the farming systems in particular areas and regions.

Thus, these typical farming systems are the starting point in making detailed farm organization studies or in arriving at long-time plans of farming for a particular area. The fact that a certain group of farmers are following a particular organization at the present time of course does not necessarily mean that it is the most profitable one for them or that they should continue to follow it in the future. It is at this point that we see most clearly the difference between these typical farms and the long-time plans of farming. The former represents what a group of farmers on given sizes of farms and in homogeneous type-of-farming areas are doing at a particular time and the latter shows the goal toward which they are working or should be working.

Starting with these typical farms and applying to them the yields and production practices prevailing in each area as well as the best information on the long-time outlook for the prices of the different products and cost-goods, a basis is provided for determining what changes should be made in the typical farming systems in order that the greatest returns be obtained from them over a period of years.

Just how this works out in a specific case is illustrated in the following example. This illustration is taken in the bean and sugar beet area

in the Saginaw Valley. In this area, the 80-acre farm is the dominant size of farm. There is enough variation in the organizations on the 80-acre farms to warrant the setting up of six distinct organizations. The chief variation found is in the acreage of beans handled, although variations are also found in some of the other enterprises. For this illustration, only three of the organizations are taken, the first with about 5 acres of beans, the second with 15 acres of beans, and the third with 30 acres of beans. These give a good representation of the range in organizations found.

Using the second organization, the most common found on these farms, which has 10 acres in corn, 7 acres in wheat, 10 acres in oats, 12 acres in hay, 15 acres in beans, 4-12 acres in sugar beets, 13 acres in pasture, 3 horses, 3-8 cows, 0-3 other cattle, 0-20 sheep and 50-100 hens, a budget or estimate of the receipts and expenses under the average prices prevailing during the five-year period, 1924-1928 is first made to illustrate the method. Yields and practices typical of the area are used. The results are shown below in Table 27.

Table 27.—Budget of receipts and expenses on a typical 80-acre farm in the Saginaw Valley.

Crops	Acreage	Average Yield per Acre	Produc- tion	Requirements		Salable Surplus
				Feed	Seed	
Corn.....	10	36	360	358	2	.....
Oats.....	10	38	380	360	20	.....
Mixed Hay....	9	1 T	9 T	9 T	.....	.....
Alfalfa.....	3	3 T	9 T	9 T	.....	.....
Wheat.....	7	20	140	78	11	51
Beans.....	15	13	195	.....	11	184
Sugar Beets...	8	8 T	64 T	.....	.....	64 T
Pasture.....	13	.....	.....	.....	.....	.....

Crop Sales:

Wheat 51 bushels at \$1.35.....	\$ 69.00
Beans, 184 bushels at \$3.17.....	583.00
Sugar Beets, 64 tons at \$7.46.....	478.00
Total	\$1,130.00

Livestock Sales:

Cattle, 3 head at \$50.00.....	\$150.00
Cattle, 5 veal at \$15.00.....	75.00
Lambs, 1800 lbs. at \$0.124.....	223.00
Wool, 160 lbs. at \$0.37.....	59.00
Hogs, 5200 lbs at \$0.10.....	520.00
Butter Fat, 1600 lbs. at \$0.45.....	720.00
Poultry, 50 birds at \$1.00.....	50.00
Eggs, 400 doz. at \$0.33.....	132.00
Total	\$1,929.00
Total Crop and Livestock Sales.....	\$3,059.00

Expenses:

Labor	\$282.00
Contract Labor on Beets, 8 acres at \$23.00....	184.00
Threshing and Shredding.....	54.00
Twine	8.00
Seed	12.00
Purchased Feeds	523.00
Other Livestock Expense.....	13.00
<hr/>	
Total	\$1,076.00
<hr/>	
Returns above cash expenses which vary with changes in organization.....	\$1,983.00

This is one way the farmer may figure in deciding whether to follow one particular organization or some other. He knows that by shifting from one crop to another or in varying the proportion of different crops the overhead expenses will remain practically constant. Interest, taxes, insurance, and machinery expense will be about the same regardless of the shifts in organization so long as they are minor shifts. Of course, if a shift is made from one type to an entirely different type such as a shift from beans and beet farming to dairy farming, then it would be necessary to take into consideration all of the overhead expenses which would change with the shift in type as well as the other operating expenses.

There is to be noted quite an expenditure for feed. This is probably more than the typical farmer spends in this area. It is to be accounted for by the fact that good feeding standards were used in calculating the feed requirements of the different classes of livestock. Ordinarily, the farmer probably does not feed quite this well and, in case he has a scarcity of feed, he is likely to feed less heavily rather than to purchase as much as shown here. But since the same standards were used in calculating the returns for all of these organizations, it will not materially affect the conclusions regarding the relative profitableness of these organizations.

Following this same general method of procedure, the returns from the other two typical organizations on this size of farm, the first with 5 acres of beans and 48 acres of crops, and the third with 29 acres of beans and 68 acres of crops were calculated. The same yields and prices were used as in the illustration. Thus we get a direct comparison of the returns from the three typical farming systems and can attribute the differences in returns directly to the differences in organization since prices of products and cost factors, as well as production practices, are held constant.

The relative returns to the three organizations above expenses which vary with changes in the organization are as follows:

Organization No. 1— 5 acres of beans and 48 crop acres.....	\$1,220.00
Organization No. 2—15 acres of beans and 62 crop acres.....	1,983.00
Organization No. 3—29 acres of beans and 68 crop acres.....	1,987.00

It is apparent from these calculations that either the second or third organization is decidedly more profitable than the first one which has

a low acreage of beans and of all crops. The returns of the other two organizations are remarkably similar. Although there is a much heavier acreage of beans in the organization of Number 3 than in Number 2, there is more livestock in Number 2 and also two acres more beets. This balance between crop and livestock enterprises accounts for the returns on Number 2 remaining high although there is only a medium acreage of beans in the organization.

Following this same general method a farmer can estimate very closely, under given conditions of production and prices, the returns he can expect from any organization he might handle on his farm. Research and extension agencies which use these typical farming systems can also arrive at definite conclusions regarding the probable returns which can be expected from them or various modifications of them for the long-time plan.

Relation of the Typical Farming Systems to the Application of the Annual Agricultural Outlook

Every year, at the beginning of the new crop year, the farmer is confronted with the problem of farm organization and operation for the incoming year. Shall he grow the same crops and livestock in the same amounts and proportions as in the preceding year or shall he change? If so, what changes shall he make? These are questions which he must answer.

In an endeavor to assist him in making his decisions as accurately as possible the federal and state agencies issue an annual outlook report. These reports bring together the best available information on prices and the probable production of the different crops and livestock for the ensuing year. Obviously, these outlooks will not apply to all farmers in the same manner but their application for typical groups of farmers who are following the same organization and producing under the same conditions are approximately the same. Unless these outlooks are interpreted to the farmer in terms of a system of farming similar to the one he is following its meaning may not be sufficiently definite to be helpful to him.

The typical farming systems on the different sizes of farms in the different areas provide the basis for using these outlook reports and enables each farmer to understand how he will be affected by future changes in production. They also enable the research and extension agencies to reach accurate conclusions as to the adjustments which should be made in the organizations of typical groups of farms in order that the greatest returns will be obtained.

To illustrate how changing price relationships affect the returns from different organizations and how necessary it is to keep acreage of crops and numbers of livestock adjusted to these changes if greatest returns are to be obtained, the returns from the three typical organizations presented above are shown under different price relations. (See Table 28.)

The prices used in the first column are averages of prices received by farmers in Michigan during the five years, 1924-1928. They are the prices which were used in the illustration in Table 27. In the second column, it will be noted that the prices of beans have been increased to \$4.67 per bushel but the prices of all the other products are the same as

in column one, that is, they are five-year average prices. With beans selling at high prices, the organization with the most beans immediately becomes the most profitable. But when beans are low in price, down to \$2.17 per bushel as shown in column three, then the returns to the organization having a large acreage of beans fall off considerably.

In the fourth column, the prices of all commodities except hay and veal are on a lower basis than given in column one. Organization Number 2 is still slightly more profitable than the other two although there is not much difference between it and Number 3.

Table 28.—The financial returns from different organizations on the same size of farm with changes in prices for the different products.

Items		Probable returns above cash expenses which vary with changes in organizations, when prices are as follows.			
		Dollars	Dollars	Dollars	Dollars
Prices of:					
Wheat	Bushel	1.35	1.35	1.35	.75
Hay	Ton	12.93	12.93	12.93	12.93
Beans	Bushel	3.17	4.67	2.17	2.17
Sugar Beets	Ton	7.46	7.46	7.46	7.46
Hogs	Cwt.	10.00	10.00	10.00	8.50
Veal Calves	Cwt.	11.98	11.98	11.98	11.98
Lambs	Cwt.	12.41	12.41	12.41	8.00
Wool	Pound .....	.37	.37	.37	.30
Poultry	Pound .....	.21	.21	.21	.20
Eggs	Dozen .....	.33	.33	.33	.30
Butter Fat	Pound .....	.45	.45	.45	.40
Type of Organization:					
No. 1. (Low acreage of all crops and beans)		1220	1312	1159	920
No. 2. (Medium acreage of all crops and beans and more livestock) ..		1983	2269	1799	1478
No. 3. (High acreage of all crops and beans and less livestock)		1987	2519	1632	1372

This example illustrates clearly how price changes affect the returns from different organizations in a different way and emphasizes the importance of taking probable price fluctuations into account when deciding upon what is the most profitable thing to do any particular year. The price fluctuations used in this illustration are no more extreme than are experienced by farmers over a period of years. With simple computations of this kind applied to typical organizations obtaining in any locality, agricultural leaders can determine with a high degree of accuracy what is the best thing for typical groups of farmers to do. In deciding upon the prices to use or which can be expected, account must be taken, of course, of the probable offset which the suggested adjustment if carried out will have upon the price.

Relation of Typical Farming Systems to Other Lines of Research Work

In addition to the foregoing uses, the typical farming systems or the typical farm concept may be used to clarify and make more definite other lines of research work.

Any studies made with the view of obtaining standard practices, standard requirements, or typical yields should be developed from this viewpoint. They should indicate what prevails upon representative farms and go further and indicate the extent to which they apply.

Likewise income studies would be much more definite and enlightening if made of typical groups of farms segregated as to size and organization as well as to location. The value of such studies is greatly minimized when results are presented for all sizes and types thrown together.

Statistical studies of elasticity of supply likewise will be more realistic and trustworthy when localized and confined to type-of-farming areas. It is reasonable to suspect that the price-supply relationships will be closer when confined to type-of-farming areas where typical groups of farmers are doing about the same thing and producing under similar conditions. This presupposes that statistical data are available by type areas which unfortunately is not true at the present time in all areas. In the future it is to be hoped that more of our basic statistical material will be obtained with the type area as a unit rather than the political unit which is the basis at the present time. There is this difficulty, however; the type of area is not necessarily constant while the political unit does not change, but the change from year to year except in rapidly changing areas would not greatly vitiate the comparability of the data.