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AN APPROACH TO AREA LAND USE PLANNING

(With Particular Reference to
Technique and Procedure)

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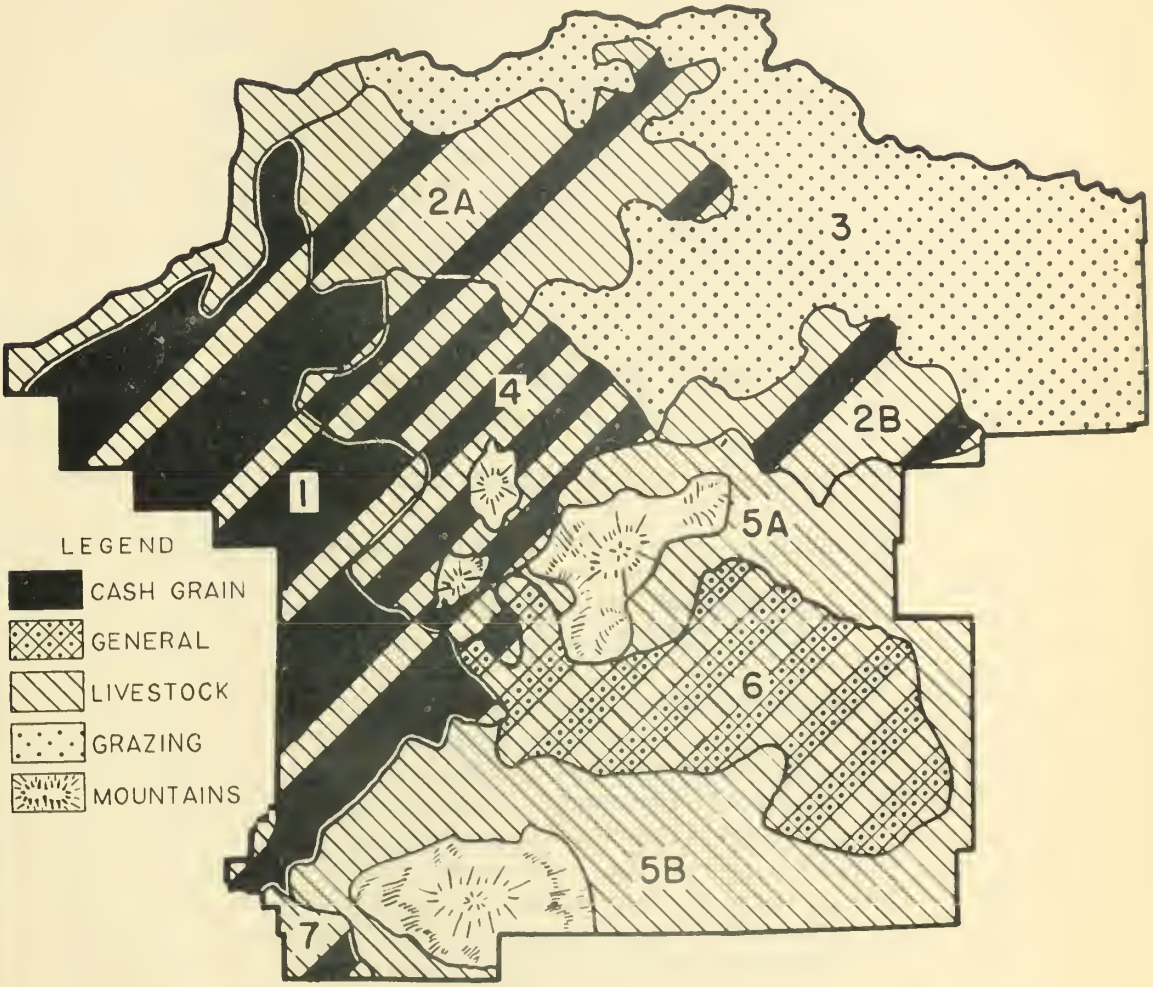
A FORECAST OF
PROBABLE BEST MAJOR LAND USES BY AREAS
FOR
FERGUS COUNTY, MONTANA



FRONTISPIECE

SUGGESTED MAJOR LAND USE OF AREAS

1	SUITABLE FOR FARM UNITS ENGAGED PRIMARILY IN CASH GRAIN PRODUCTION, WITH SUPPLEMENTAL LIVESTOCK ENTERPRISE.
2A–2B	LIVESTOCK FARMS AND RANCHES, WITH SECONDARY CASH GRAIN PRODUCTION.
3	SUITABLE FOR EXTENSIVE GRAZING USE IN GRAZING DISTRICTS, SERVING THE ADJACENT AREAS.
4	CASH GRAIN FARMS WITH VARYING DEGREES OF COMBINATION OF A SUPPLEMENTAL LIVESTOCK ENTERPRISE, AND LIVESTOCK RANCHES.
5A–5B	LIVESTOCK RANCHES ASSOCIATED WITH LOCAL GRAZING DISTRICTS.
6	FARMS OF A GENERAL TYPE, WITH LIVESTOCK, CASH GRAIN, AND SPECIALTY CROPS.

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AN APPROACH TO AREA LAND USE PLANNING
(A Progress Report Based upon Fergus County, Montana)

INTRODUCTION

Correlation of Farm Economics and Land Economics Studies

Farm management studies have in the past been concerned primarily with the question of how the individual farm operator could plan his production program so as to realize the highest returns upon the resources at his command. Land economic studies have undertaken to classify the land resources and to draw conclusions regarding the highest economic use or uses for geographic areas and for grades of land in such areas or regions. In making this evaluation, land economics has had to go beyond considerations of market prices and costs into questions of public benefits and values on such matters as resource conservation, community organization and public service, public finance, and other aspects of alternative land uses.

A comparison of the objectives of these two fields shows that the policies of the field of land economics as to economic uses of land and the concomitant policies regarding tenancy, conservation, size and type of farm units, and rural public facilities are, for many areas, beyond the reach of adjustments which can be made through the farm management approach.

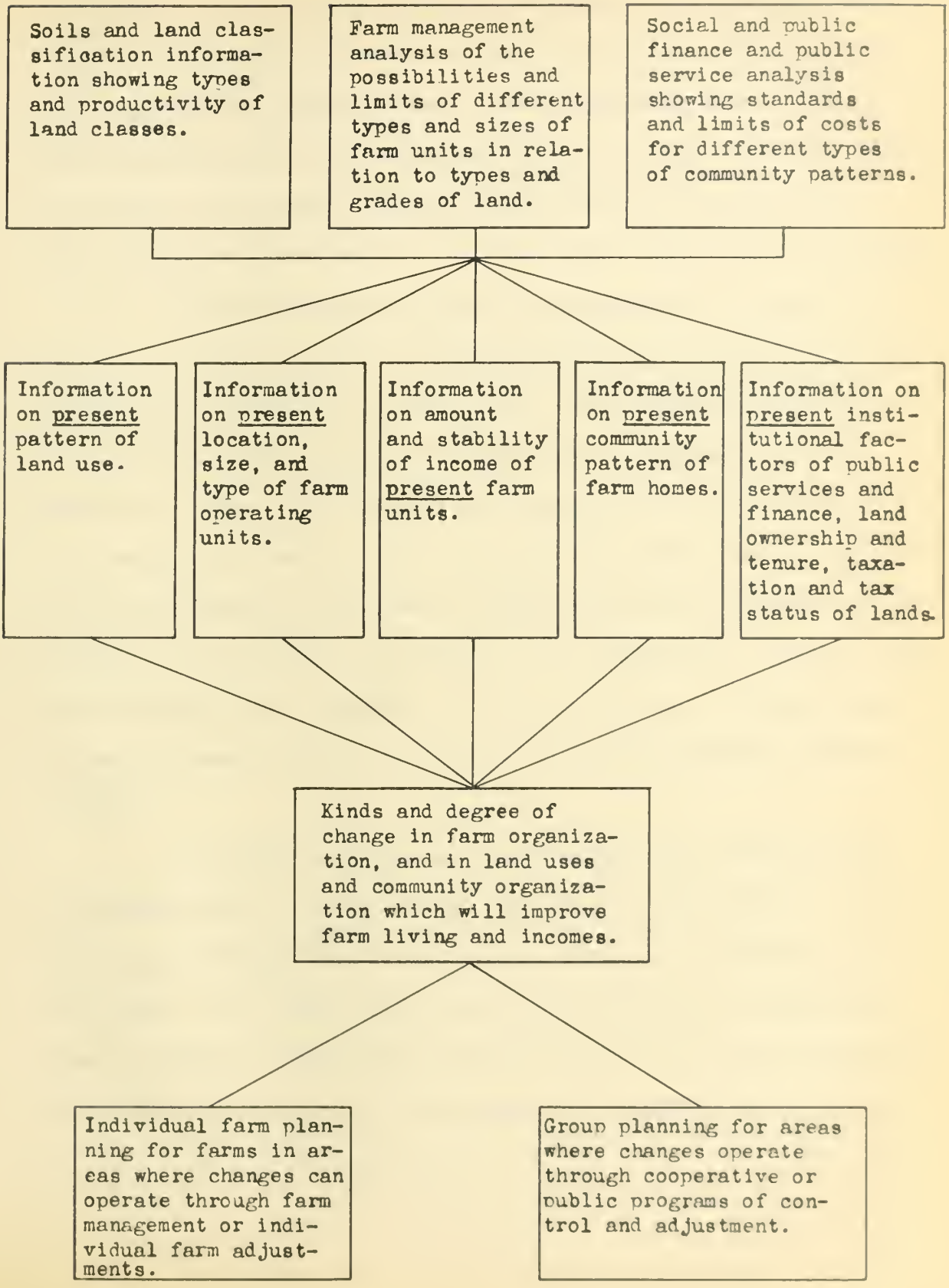
The field of land use planning undertakes to apply the considerations of both farm management and land economics to areas where the policies and programs of adjustment must operate to a considerable

degree through groups rather than through individuals. These area policies and adjustment measures are of such a nature that they cannot be successfully developed or carried forward without the active participation and support of the people concerned. Certain types of research information may be developed without such participation, but more frequently the informational background and the concepts of land use adjustment policies and measures must evolve concurrently through continuous contact between the research agency and the farm operators, landowners, and agencies concerned in the adjustment program.

This interrelationship of the use of farm management and land economics information in the development of agricultural adjustment policies may be illustrated by the diagram following page 2.

While it is true that the development of policy as to what constitutes the highest economic use of different kinds and grades of land and water resources involves a consideration of more than entrepreneurial profits, it is also true that such policy must rest in a considerable measure upon the results of farm management studies. These can be interpreted to show approximately at what agricultural prices lands of a certain grade of productivity become marginal for their alternative uses. A comparison of this point of price marginality for some use, or combination of uses, between areas and regions, with accompanying data on total potential national output and national demand, gives an approach to a national policy on what constitutes regional and area marginality for a specific agricultural use or combination of uses of land under existing production technique.

FACTORS TO BE CONSIDERED IN AREA LAND USE PLANNING



It was in anticipation of the future need for this type of information that, some ten years ago, the Montana Agricultural Experiment Station began to develop a procedure for interrelating the work of farm economics and soil survey. The experimental work in farm organization and costs of the Fairway Farms Corporation, under the direction of Dr. M.L. Wilson, established yield and price relationships under which the mechanized dry land wheat farm could sustain operations.

In order to apply this farm management work to research and extension in land economics, it was necessary to find a means of interpreting the results of soil survey into wheat yield and other production potentialities. This was accomplished by developing, through historical survey, the correlation of wheat and other crop yields with the various soil series. The soil series were classed into color groups (color also being a good index of precipitation in the northern Great Plains), and the historical yields of the different soil series in each of these groups were weighted as to their influence. The result gave a range of wheat yield probability for each of the groups or grades of land.

A similar procedure was then developed for applying ranch management data to grades of range land, with grades defined in terms of acreage requirements for carrying an animal unit during the grazing season. The result of this shows the grade point at which grazing land stands up under the costs of using it in the ranch operating unit, where it sustains the land charge accompanying private owner-

ship, and where it must be used in extensive grazing areas under private group, or public management.

This, however, did not complete the development of the procedure. In order to be able to see the application of this technique to land use adjustment so as to develop policies of adjustment and to develop adjustment programs, it was necessary to have the existing picture of the present land uses, the type and size of farm and ranch operating units, ownership and tenure of land, tax status of lands, rural government and public service organization and costs, and other sets of information which will be illustrated later in this publication.

With this information mapped in local detail, it is possible to develop area analyses and statistical summations which indicate, by areas, the type and extent of adjustments and the adjustment measures which can be applied. This coordination of material shows, for example, the extent to which, in an area, lands which are now used for cash grain production stand up under such use. It shows where farm operating units are of insufficient size to carry on what may be an economic use of the land, or where a change in the type of farm or ranch operating units is necessary in carrying out the highest productive use of the land. It shows where grazing lands must be shifted to public ownership, and where they can support the land charge accompanying private ownership. A clear picture of these indicated adjustments, by areas, is necessary both in formulating policies, in de-

veloping various types of adjustment measures, and in determining which of such measures applies to an area or an interrelationship of areas.

Steps in the Procedure

The main steps of procedure in this approach may be summarized as follows:

1. Develop farm management information to show the highest alternative use for the different types and grades of land and water resoures, and the size and organization of operating units in which such use or combination of uses can be carried out.

2. Interpret soil survey information into types (farming, grazing, etc.), and grades of these types, showing the potential crop yield or other productivity of such grades, and map this classification material in local detail.

3. Develop the information as to present land use and type and size of existing operating units, mapped in place.

4. Develop detailed map information showing tenure and ownership classes, land tax status, public facilities, local government finance conditions, and other pertinent data showing the institutional and social pattern which has developed from the present utilization of the land resource and farm operating units carrying on such use.

5. Delimit major areas of "homogeneity of characteristics" by association and comparison of all the detailed map data, and com-

pile the statistical analysis for such areas from the sources from which the maps were developed.

6. For areas where adjustments are indicated, prepare a quantitative summation on types and degrees of such changes. The farm management information may show, for example, that fourth grade farm land is below the margin for cash grain production. The land classification map may show an area consisting largely of such grades of farm land. The present use map may show a large part of such land now in cash grain production. The operating units map and other map data on present situation reflects certain aspects of these circumstances.

7. By bringing together the analysis of information and the ideas of individuals, groups, and agencies involved, the adjustment procedures and measures which will best fit the needs of the area are developed.

This approach may appear to some to place an undue emphasis upon land resources and their uses. It has been developed in a region where types of farms, land uses, and the accompanying features of land ownership and tenancy, public finance and services, are still in process of fairly rapid evolution. In other words, the relationship between people, land resources, and the use of resources is not yet fixed and crystallized to the degree that it is in some other regions. Accordingly, the institutional factors of land ownership, tenancy, taxation, public finance, and public facilities and service are looked

upon as accompanying features of the present pattern of land use, and consequently as something to be changed to fit land use adjustment programs.

In other regions these institutional features of rural life and use of resources may be more nearly the controlling factors in adjustments intended to improve rural life. Legislative procedure and governmentally operated programs to change these institutional factors may be important instruments of adjustment in regions where the possibility or the incentive is lacking to bring about fundamental changes in the economic use of agricultural resources. This is a question yet to be demonstrated.

It is felt by the authors that the research approach outlined above is particularly applicable to the western plains region, but also that the principles involved in it have a much more general application.[1/]

Fergus County, Montana, Chosen to Illustrate This Approach

Fergus County is physically typical of the western plains region, and particularly of the northern Great Plains. There are considerable area differences in soil types and in topography. The average annual precipitation for the period of record varies for different parts of the county between 12 and 18 inches. Some areas of the county are in highly specialized cash grain production, others in

1/ This approach is developed in considerable detail in a series of eight bulletins entitled "Readjusting Montana's Agriculture" by the Montana Agricultural Experiment Station. These bulletins are numbered 306, 308, 309, 310, 311, 315, 318, and 319. (Bozeman, Montana.)

combination cash grain and livestock grazing, and others in stock ranches. Irrigated crop farming is practically non-existent. Small stream diversion is used to a considerable extent by stock ranches for irrigated feed production.

The first farm settlement of this county was about thirty-five years ago. A combination of cheap land, a rich soil and virgin sod, and comparatively good grain prices, resulted in a rapid homesteading of all but the extremely rough lands. As years passed the picture changed; yields decreased, cultivation destroyed the sod, and drought and winds caused considerable soil drifting.

The adjustments involved in this situation center around the thesis that certain changes can be made to provide a continuing successful agriculture and a progressive agricultural community. Certain of these changes can operate through the individual planning of farm operators, others through the planning of groups who have a "community of interest" in setting up certain controls or in the cooperative carrying out of certain adjustment measures.

Land Use Planning Procedure in Relation to Objectives and Agencies

Land use planning, as conceived in Montana, may be divided into three phases, i.e., research, education, and action.

Research

The objectives of research are to develop the facts and principles which are likely to be pertinent to the development and operation of action programs of adjustment. Because of the whole-hearted

cooperation of all departments of the Montana Agricultural Experiment Station and the availability of labor from C.W.A., F.E.R.A., N.Y.A., and W.P.A., large numbers of detailed studies and compilations have been possible which could not otherwise have been undertaken.

The research materials considered may be roughly divided into two general classes, i.e., broad background for the entire State, and detailed and localized material (usually mapped in place).

The objectives of the use of background materials are to localize areas in which problems of land use occur, and to afford a basis for generalizations as to types of action which apply to the problems.

The objectives in the use of localized materials are to develop adjustments which are applicable to specific areas, and these almost invariably require consideration of individual parcels of land and individual owners. Thus the specific characteristics of the land must be related in considerable detail to specific parcels so that detailed analysis may be made and individual owners may see the effect of a given adjustment upon their own individual welfare and that of the community. Since adjustments in land use may be either individual or collective, it frequently becomes necessary to consider composites of individual parcels. This will be more fully developed later in this report.

As has already been indicated, there are certain types of materials which appear generally essential to a consideration of land

use adjustments. Among these are the following: (1) productive capability of soils mapped in as much detail as possible; (2) present land use and operating units; (3) the present situation as to types of ownership, the pattern of tax delinquency, mortgage indebtedness, and other materials related to the present pattern of use of the land; and (4) social and institutional factors.

Other types of materials have been developed, but the above appear to be the most essential. The greater the complications found in an area, the more is it apparent that quantities of other specific material will be required. In many areas water resources, for example, are of primary importance, and a complete inventory of facts on this subject may therefore be of primary importance. In other areas, problems of public finance may be of first importance. All types of subject matter related to the use of resources in relation to population must be considered, but some subjects are of greater importance in one area than in another.

Education and Cooperative Contacts

The objective of education in land use planning is to inform all individuals and agencies interested in an area so fully that they will undertake the adjustments in accordance with the facts and in line with sound conclusions. There are many methods and agencies which may become important in the program. Perhaps one of the most effective educational methods is to induce direct cooperation of the people of an area to assist in the development of factual material

and in the formulation of conclusions from the facts. If those directly affected by a given adjustment are a party to the development of the program, it then becomes their program and is not something superimposed upon them from above.

In every State there are many agencies which are engaged in the administration of land or which perform certain functions closely related to the land. As materials are developed, they are immediately extended to these agencies with such explanations and recommendations as are pertinent.

In Montana the following agencies have been directly interested in the work of the land use planning program and have participated therein:

The Agricultural Experiment Station
The Agricultural Extension Service
The Vocational Education Service
State Planning Board
State Water Conservation Board
State Grazing Commission
State Highway Commission
The Montana Farmer (State-wide farm paper)
United States Forest Service
United States Soil Conservation Service
Agricultural Adjustment Administration
United States Reclamation Service
Rural Rehabilitation Division of
Resettlement Administration
Federal Land Bank
United States Bureau of Entomology
Rural Resettlement Division of
Resettlement Administration
Land Utilization Division of
Resettlement Administration

It should be emphasized that educational and cooperative work is conducted concurrently with all phases of research and plan-

ning activities. The value of contributions of all parties to the work in the development of action programs cannot be overemphasized.

Many of the above mentioned agencies are now conducting action programs which affect land use in one form or another, while some are educational in scope only.

Action Programs

Regardless of the agencies or methods involved, the objective is to bring about the best possible use of the resources and provide the best possible machinery of government and social facilities which will adequately serve as large a population as possible. In some areas this may mean the adding of further population to the area; or it may mean some shift of people from the area to more suitable locations; or it may make possible the raising of general social standards for those who are already in the area.

The removal or discontinuance of a one-room school, but continuance of adequate school facilities otherwise, may materially reduce the tax burden. The controlled use of grazing land now used as "open range" may so increase its productive capacity as to materially increase the income of the operators. These and many other shifts are possibilities in land use planning. The measures by which these adjustments may be put into effect are the problem of the land use planner. Because these adjustments usually affect individual owners and their income and outgo, it is obvious that materials contributing to these objectives must be of a detailed and localized character. The

mapping of generalized census materials by minor civil divisions or by counties is not adequate for the analysis as to areas or the development of area concepts as to adjustment programs. Materials must usually be mapped in place and with as much accuracy as possible.

Approach to Area Analysis

Obviously the methods to be followed and the materials considered essential to the localization of areas will vary within wide limits from State to State. Because certain methods and materials are indicated here, the reader should bear in mind that these are suggestive only, and those to be used under any other situation will be those which can be developed with the available labor and personnel in the particular situation.

Because very wide variations exist within the State, it was necessary to determine the location of areas of some degree of homogeneity as to various characteristics. Because of the detailed character of the problems, it is evident that concentrated attack cannot usually be made on all problem areas at the same time. Indeed, the details of a single area may be of such a character that only certain phases can be undertaken at one time.

The selection of the area to receive detailed consideration is done to a considerable extent on the basis of qualitative analysis with only inadequate quantitative material available. Certain types of subject matter are of importance, but the availability of materials and the amount of personnel which can be devoted to various

types of analysis will frequently determine whether or not a certain type of material may be used.

In nearly all States the various types of material in the United States Census have been analyzed and summarized in one form or another. This may consist of location of land and farms by counties and by minor civil divisions, the number of farms, acreage of various crops, numbers of livestock, tenure status, and similar materials. Population distribution by minor civil divisions and by age groups is of major usefulness. The separation of acreages of irrigated land from that which is farmed by dry farming methods is portrayed. These materials give the general background of the agriculture and population distribution, but do not depict adjustment areas in any detail.

Adjustment Programs

Before considering the possible applications of each of several types of land use adjustment programs to the Fergus County area planning study and to various sub-areas in the analysis of adjustments, it appears to be desirable to name and describe briefly as many as possible of the types of adjustment programs which appear to be applicable. It also appears to be in point to indicate as far as possible in what specific type or types of adjustment situation each of the various programs appears to fit best.

Adjustments in Size of Farm Units Through Commercial Credit Operations

This type of adjustment method may be called a land use ad-

justment program only in so far as it is developed from land use and farm economic information with the rather specific purpose and policy of adapting credit policy to the indicated adjustments. This kind of an adjustment procedure appears to fit areas where the desirable change in land use can be carried out through modifications in the size or in the nature of the present operating units. As in most of the farming development of the western States, the homestead laws were responsible for the establishment of many farm units in Fergus County which were too small in size for efficient operation under Great Plains agricultural conditions. Farm management studies indicate that where an area in the western plains region shows a high percentage of farm units as having a gross income expectancy of less than $1,000, it is very likely to mean that an adjustment in fundamental land use which rests upon a change in the size and kind of operating units is necessary.2/

Recent farm management studies show that in the cash grain areas, such as Fergus County, the family farm can, with modern technique, efficiently handle a section and a quarter (800 acres) of crop lands in a specialized cash grain farm in the Great Plains dry farming regions. A combination cash grain and livestock farm can handle

2/ The term "gross income" as used throughout this report refers to the calculation of the average annual expectancy of total money income and does not include any calculation of the value of family living items furnished by the farm. Gross income of less than $1,000 was arbitrarily selected as being critically low since the operating cost of any farm in the western plains region absorbs most, if not all, of this amount.

efficiently one-fourth to one-half section (180 to 320 acres) of crop land and two to three sections (1,280 to 1,920 acres) of grazing land with thirty to forty head of cattle. The livestock ranch can, with family labor, handle one hundred to one hundred and fifty head of cattle using six to ten sections of grazing land. The trend of adjustments growing out of the size of operating units which came out of the homesteading procedure has been a gradual consolidation of units to increase the size of cash grain farms in the better farming areas.

In the intermediate type of area where specialized cash grain production has been less stable, the trend of the adjustment has been toward the consolidation of units and the acquisition of control of adjacent or outside grazing lands. This is a kind of adjustment situation in size and type of operating units which is a land use adjustment situation to which commercial credit policies may apply.

Present commercial credit agencies can shape their policies in the direction of facilitating such adjustments with available budgetary data relative to desirable size and type of operating units, and the analysis of such adjustments in size and type of operating units in relation to the present land use situation of an area. The information which forms the basis of such a program involves a careful correlation of the local information on farm management with information on resources, their present uses and ownership, and their use capabilities. This is a constructive type of adjustment program

which can in some areas go far toward making the adjustment in land use. Such an adjustment may mean that there will eventually be fewer farm units in the area, and credit will work as a partial and gradual adjustment program fitting in with other types of programs.

Rehabilitation Loans in Relation to Land Use Adjustments

This type of adjustment program also fits primarily areas where the desirable adjustments in land use rest mainly upon changes in the size and type of present operating units; in other words, areas where the existing operating units will be the basis of change without any great diminution in the number of such units.

Rehabilitation loans to individuals for the purpose of acquiring land in order to make adjustments in the size and type of operating units where land bank credit cannot see fit to operate are a possible means of adjustment in land use and in the related economic and social adjustments. The land banks have certain limitations in their present basis of appraisal where leased lands are an important part of the farm units. The present budgetary procedure of the land bank's appraisal methods makes it difficult for them to consider leased lands as a part of the operating unit in deriving an analysis of the debt-paying power of the unit.

Rehabilitation loans to individual operators to assist them in getting the right type of working capital, such as livestock, are also a part of an adjustment program from the standpoint of emergency credit of this type. On the other hand, where rehabilitation grants

rather than loans are made to operators where they cannot possibly make their adjustment in their present location, the making of grants rather than loans is also a constructive measure toward eventual changes in major land utilization. In areas where the eventual adjustment appears likely to be complete abandonment of present farm land uses and reversion to some of the various types of more extensive uses, it is not sound policy to make rehabilitation loans to the existing operators when the adjustments in land use cannot be made through credit assistance leading to changes in the size and type of present operating units.

An instance of the possibilities for coordination of different adjustment programs is illustrated by the fact that the Agricultural Adjustment Administration might, in the future working out of their Soil Conservation Program, seek to make greater shifts from cash crops to cover crops and feed crops in some areas as compared with others. If this is done, the fitting in of rehabilitation loan policy with such area differences is clearly obvious, particularly where such shifts in land use will mean a greater emphasis upon livestock production and need for different types of credit.

The Agricultural Adjustment Administration Soil Conservation Act

This program deals with areas where the adjustment is primarily one of internal farm organization changes for the purpose of soil conservation rather than fundamental shifts in land use. However, in the less stable farming areas, the operation of this act merges into a land use adjustment program. If carried out over a series of years,

this type of program could facilitate shifts in marginal areas entirely from an intensive cash crop use over to diversification and extensive uses based primarily upon livestock. It appears probable that there are many areas in the Great Plains where this will be the trend. Such a change, working primarily through the present operating units, will mean less risk and more stable farm incomes, but will still mean that the majority of the units may be too small.

The Agricultural Adjustment Administration Soil Conservation program, as a means of facilitating a transitional phase in the adjustment of the marginal farming areas, can fit in with resettlement programs and individual relocation efforts over a series of years. With this would appear eventually to come a combination of holdings into larger sized operating units, again with the assistance of commercial and emergency credit agencies.

The Operation of the Soil Conservation Service

The erosion control farm contracts now in operation by the Soil Conservation Service involve to a greater or lesser extent land use planning principles and procedure as well as individual farm management and farm practices. While the purpose of these projects involving contracts with farmers is presumably to protect and restore the lands capable of sustained crop use, there are some areas where soil losses have proceeded to a point where major shifts in the use of land are indicated. The adjustment in such situations is generally toward a different and more extensive type of land use with

eventually all of the accompanying changes in community pattern, land tenure, etc. In such an area, the soil conservation program, as carried out by the Soil Conservation Service, may involve land use planning procedure in the matter of attempting to tie up the use of adjacent grazing lands, through grazing districts or other procedure, with the farm lands. This is especially true when the erosion control measures on the farm lands mean more roughage and feed grain, the only outlet for which may be an increase in livestock numbers on the farms.

There is another side of the land use relationship involved in this type of adjustment. Farms are producing more feed crops in carrying out their adjustments in type of crops which may or may not fit in with local markets and fit in with the need of nearby range livestock operators for an increased or more dependable supply of supplemental feed. Such inter-area relationships appear to be a very pertinent phase of the land utilization aspects of erosion control projects.

State Grazing Districts

The essential difference between a local grazing district, organized under State statute, and a grazing district organized under the Taylor Act, is that the former is a cooperative non-profit business organization for the purpose of consolidating through lease, ownership, or otherwise, and for the purpose of planning the management and use of an area in which the users have a community of

interest. The grazing districts organized under the Taylor Act, however, apply only to remaining public domain lands, and do not provide the business organization and the legal and administrative set-up for control and use of anything but public lands. Grazing districts organized under the Taylor Act are not essentially an instrument for planning and carrying out adjustments in the use of land. The Montana State grazing districts have been able to set up flexible procedure for tying their operations in with other adjustment programs such as land utilization purchase projects, Soil Conservation Service projects, and the operations of the Agricultural Adjustment Administration.

The reader who is interested in further study of Montana grazing districts is referred to Montana Agricultural Experiment Station Bulletin No. 326 entitled, "Grazing Districts in Montana: Their Purposes and Organization Procedure", and also to a mimeographed circular by the Montana Extension Service. This circular gives added details on legislation and administrative rules and procedure on grazing districts developed under the Montana legislation.

The formation of State grazing districts as a land use adjustment program appears to fit areas having intermingled and diverse types of ownership of grazing lands and abandoned and reverting farm lands when the situation is one of unstable tenure and uncontrolled use. Public lands -- county, State, and Federal -- where inter-

spersed with other types of ownership, should in many cases be fitted into the local grazing district set-up as the best means of handling them on a long-term lease basis.

Government Purchase of Sub-standard Farm Land Areas for Land Use Adjustment and the Relocation of Farm Families

This type of program fits areas where a fundamental maladjustment exists in the relation between rural populations and agricultural resources. In such "reversion" areas where the land will, over a period of years, revert to more extensive uses such as for grazing, forestry, recreation, wildlife, etc., a program of public purchase and ownership and assistance in the relocation of residents may be the most desirable means of facilitating the readjustment and lessening the cost of an inevitable change.

Some of the alternative measures for assisting in the relocation of people are: (a) projects to develop new agricultural areas for resettlement purposes; (b) infiltration into established farming areas where there can be an economic subdivision of existing farm units through Federal purchase or through loans to individuals for such purchase; (c) development of part-time farming units where supplemental employment opportunities exist in relation to city industries, forestry, etc.; (d) assistance to individual relocation through organized information services.

Public Acquisition Through Tax Sale

This type of land use adjustment program fits areas where farm abandonment and absentee ownership have proceeded to a point

where but few people are left in an area, and the result is open and exploitative use of land and chronic tax delinquency. In such areas, a public purchase program may not be advisable because of the limited number of people involved and the need for available public funds for purchase and resettlement in other areas where the human and social side of the adjustment is more important. Such an area may be of the type or in a condition which private ownership does not fit, so that reversion to public ownership through tax sale appears to be the procedure involving the lowest cost. The present Montana legislation requires that lands acquired through county tax sale must be put up at public auction for resale. If not resold, such lands can then be leased to State grazing districts at any price determined upon and for a ten-year lease term.

The present requirement of putting such lands up for sale at public auction for the amount of taxes involved, coupled with an initial payment requirement of only one-fourth of the price, has resulted in continued mal-use and exploitation of these lands. Lands which have a chronic history of tax delinquency may find their best use and management through public ownership. The administrative agency for holding such lands and directing their use may be the county, the State, the Federal government, or some combination of these, depending upon the legal factors and economic situation involved in the various States and localities.

Where lands are acquired through this procedure and lie

adjacent to solid blocks of public domain organized into Taylor grazing districts, it might be best to fit them into Federal ownership. On the other hand, they may fit best into already organized State or national forest units or wildlife areas. They might be fitted through county or State ownership into State grazing districts or recreation areas. This is probably a question of policy for State legislative determination with such assistance and information as can be given by State and national land policy research agencies.

Adjustment Programs in Public Finance, Governmental Organization, and Resulting Public Services

Any adjustment programs of this type must generally fit in as a part of other land use adjustment programs. The purpose of an adjustment plan in public finance and rural government units appears to be primarily for the purpose of working out the public finance cost limits, the government services, and the public facilities which fit the economic use of resources and which can be sustained by such resources. There will be some areas where the use of resources and the relation between resources and population are not particularly out of adjustment, but in which governmental costs and services are out of line with what can be maintained by the county or other local unit. Such a situation may call for a plan of adjustment in governmental organization and public finance without any particular relation to land use planning.

The working out of such a plan may involve the question

of efficiency in the present use of limited public funds and may also involve a question of more efficient methods of raising public revenue through better assessment procedure, such as the basing of assessed valuation upon a careful classification of lands as to their grades or productivity. A plan of adjustment in public finance and governmental units and services, whether associated with other adjustment problems or whether it is an adjustment program in itself, raises questions as to what may be desirable social policies in maintaining public services and facilities such as roads, schools, etc., beyond what the local tax revenue can support.

Zoning of Rural Land

This type of land use adjustment applies primarily to areas where the control of the use of the land resources rests largely with individual ownership and private initiative. Where such conditions exist group action may be justified in invoking the restrictive powers of the State to control such rural land uses and farm practices as are not in conformity to the welfare of the community. Zoning is largely untried except in areas where it is possible to make a clear-cut differentiation between agricultural and non-agricultural uses. For this reason, it may be of limited use as a means of control between different alternative agricultural uses for an area.

The zoning of an area as to its uses between arable and non-arable agriculture in most parts of the Western States raises involved problems in the organization and management of individual

farms and ranches. The use of zoning as a restrictive measure in rural land use to support other forms of group control is an unexplored field which may offer certain possibilities in the Plains area. A cooperative grazing district, for example, attempts to control the land of an area for a certain type of use by lease and ownership of land by the association. But the district may not be able to achieve or to retain complete control through leases. A rural zoning measure might restrict the use of the area against cash crop farming on the basis of conservation and the high public costs of scattered settlement. The stock ranches operating within such zoned areas might, however, find it desirable to produce for livestock feed certain of the crops which as cash crops were zoned against, and even to sell a part of such crops in certain years. This would involve a rather careful definition of uses and types of operating units.

An argument in favor of land use zoning procedure is that, if it proves to be workable, it would accomplish adjustments on a large scale and possibly rather rapidly without great cost in public funds. Zoning as a supplement to grazing district operation may prove a valuable part of the program in the Plains area.

Extension and Educational Programs

Efforts along this line can be directed into two different although related types of activity: first, those designed to use information for the purpose of motivating individual incentive

and action in the direction of making sound adjustments or in the prevention of maladjustments which might develop insofar as they are within the control of the individual; and second, the use of information to guide and shape the programs of various public administrative bodies and agencies.

It may be possible in certain situations to accomplish more in the direction of sound land use adjustments by furnishing information which shows farm operators that their stability and income will be enhanced by a different type of farming and use of their available resources, than can be accomplished through a public administrative program of action and adjustment. The various State and Federal administrative agencies carying out adjustment programs in the State of Montana and in Fergus County have already been enumerated.

Costly mistakes and serious delays have been avoided by the agencies working out the programs of adjustment due to the thorough research studies that have been carried on and the resulting definite information made available.

TYPES OF RESEARCH MATERIALS, THEIR SOURCES, PROCEDURE IN THEIR DEVELOPMENT, AND THEIR USES

The primary purpose of this section is to illustrate the types of materials used in the approach described in the preceding section, and to show the sources and purposes of individual items of material. The comparative analysis of these materials for the delimitation and characterization of areas will be treated in the next section.

Farm Management Materials

These consist of farm and ranch organization and budgetary studies which have been set up to tie in with the three major types of land (dry farming, grazing, irrigated) and the grades of such types (grades one to four for farm land, and one to five for grazing land) of the soil survey. The details of how this material was developed are too long to reproduce here.[1/] The grades of the various types of land developed from the soil survey have been correlated with crop yield and grazing capacity experience. The different possible types and sizes of farm organization (cash grain,

1/ See Montana Agricultural Experiment Station bulletins No. 278, "Farm Organization as Affected by Mechanization"; No. 290, "An Analysis of Agriculture on the Milk River Irrigation Project"; No. 295, "Economic Changes in Montana's Wheat Area"; No. 302, "The Economics of Range Sheep Production in Montana"; No. 311, "Readjusting Montana's Agriculture: Economic Changes in Montana's Range Livestock Production"; No. 321, "An Analysis of the Present Status of Agriculture on the Sun River Irrigation Project".

combination cash grain and livestock, stock ranches, general, irrigated specialty crops, dairy, etc.) were then studied to determine their income expectancy on these various types and grades of farm and range land as developed by correlation of soil types and yield possibilities. The major conclusions from this are the following:

1. First grade dry farm land will sustain family sized grain farm units with a section (640 acres) of crop land. Land of this productivity would sustain smaller sized family farm units on a relatively favorable income basis if it were possible to maintain yields with a wheat-summer fallow rotation. Agronomic data indicate that soil-building crop rotations and soil-conserving practices are eventually necessary.

2. Second grade dry farm land will sustain cash grain operations with about one and one-half sections of farm land.

3. Third grade farm land will sustain cash grain operations in units of two or more sections of crop land where level topography and large fields make possible the use of low cost methods.

4. Fourth grade farm land will not sustain cash grain operations.

5. First and second grade farm land is frequently located so as to make possible its association with grazing lands and livestock production.

6. First and second grade grazing lands will sustain "self-contained" ranch operating units of a size to operate largely

or entirely on a family labor basis.

7. Third and fourth grade range lands will find their most economic use in: (a) grazing district management, with the accompanying lower fencing and water costs, and when associated with adjacent farm areas, or on ranches in areas having adequate winter feed production and spring-fall range; or (b) in ranches of a sufficient size to use low cost methods of fencing and water development, and producing sufficient income to maintain a home in a town or community center.

8. Fifth grade range land will not sustain the land charge necessary to induce private ownership and management.

Materials Showing Natural Agricultural Resources

The types of materials presented under this heading are:

1. The land classification made from the reconnaissance soil survey.

2. The classification of the United States Geological survey.

3. The township average wheat yields from the A.A.A. records for the years 1928-1935.

4. Township data on number of farms per township and average annual bushels of wheat produced per farm, from A.A.A. records for the period 1928-1935.

5. Soil erosion reconnaissance as made by the Soil Conservation Service.

6. Precipitation records.

These are the principal materials in relation to which the farm management data are considered in analyzing area land use possibilities. The order in which the materials in this and subsequent groups is presented represents the usual order in which the materials are considered in building a comparative analysis of the areas and their characteristics. A description of these materials follows:

1. Land Classification Based on Soils and Production (Fig. 1). This material was prepared by the Agronomy and Soils Department of the Montana Agricultural Experiment Station, in cooperation with the Bureau of Chemistry and Soils. Historical wheat yield data and range land carrying capacity data were obtained as a part of and subsequent to the field work on the soil survey. This map shows a classification of the different soils series into four grades of farm land and five grades of grazing land. All of the land which is now being farmed or which has at some time been farmed was classed as "farm land". Various soil series were classed into color groups, these four groups being the very dark brown soils, brown soils, light brown, and gray. This map also shows certain aspects of topography such as mountainous areas, stream bottoms, lakes, etc. Where grazing lands are too rough in topography or too poor in soil to be considered potential farm lands, a grazing capacity reconnaissance appears to answer the needs of land classification procedure illustrated in this piece of material.

LAND CLASSIFICATION
BASED ON SOILS AND PRODUCTION
FERGUS COUNTY, MONTANA

FIGURE 1

L E G E N D

FARMING LAND
GRADED AS TO YIELD OF SPRING WHEAT ON SUMMERFALLOW

GRADE

- 1 ST = 22 BUSHELS OR OVER
- 2 ND = 16 TO 21 BUSHELS
- 3 RD = 12 TO 15 BUSHELS
- 4 TH = 8 TO 11 BUSHELS

MISCELLANEOUS LAND

- LAKES AND STREAM BOTTOMS
- MOUNTAINS
- TIMBERED GRAZING

GRAZING LAND
GRADED AS TO ACRES PER 1000 LB. STEER FOR 10 MONTHS

GRADE

- 1 ST AND 2 ND 27 ACRES OR LESS
- 3 RD AND 4 TH 27 TO 55 A
- 5TH 56 ACRES OR MORE

PREPARED BY THE AGRONOMY DEPARTMENT, MONTANA AGRICULTURAL EXPERIMENT STATION, BASED ON SOIL RECONNAISSANCE CONDUCTED COOPERATIVELY WITH THE BUREAU OF CHEMISTRY AND SOILS, U.S.D.A.

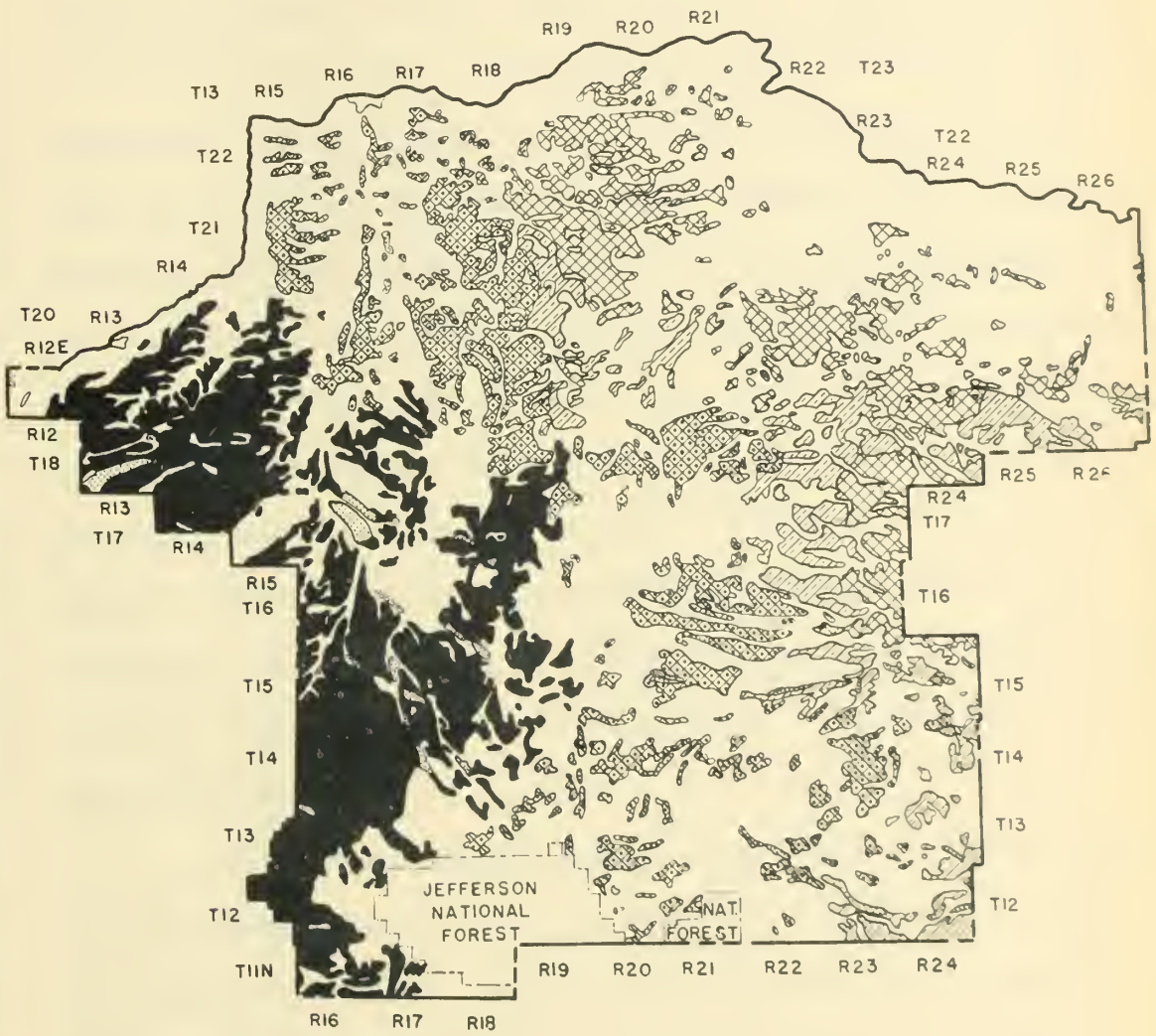
This is the first of the maps which is considered with reference to the farm management research conclusions as outlined above. By relating this map to farm management materials, it is possible to see the natural land use areas and to reach tentative conclusions regarding the economic land use and type of farm and ranch operating units for such areas. However the present pattern of land use and the resulting production from such use is also a primary indicator as to the location of area boundary lines and the use-capability of such areas. In this respect a significant correlation may be seen through comparisons of Figure 1 with the map of Land in Cash Grain Farms, shown in Figure 7, and with the yield data shown in Figure 3.

2. The Land Classification Based on U.S.G.S. Maps (Fig. 2). This material was prepared by the United States Geological Survey for use in connection with certain revisions of the homestead laws. In general, it has been found to compare favorably with the above land classification material, although it is not developed in such form as to fit in very well with the approach of applying farm management consideration to it.

This map was prepared by a field survey which undertook a correlation of materials on topography, geologic formation, botanical survey material, and farm use experience. It has been found to be a reasonably workable substitute in the thirty-two counties of the State where soil survey has not been completed. Soil survey

LAND CLASSIFICATION
BASED ON U.S.G.S. MAPS
FERGUS COUNTY, MONTANA

FIGURE 2



L E G E N D

FARMING LAND

FARMING GRAZING

GRAZING FORAGE LAND

GRAZING LAND

IRRIGATED LAND

NONTILLABLE GRAZING LAND

REDRAWN FROM U.S.G.S., 1929, BY OFFICE OF THE MONTANA LAND USE PLANNING SPECIALIST, LAND UTILIZATION DIVISION, RESETTLEMENT ADMINISTRATION, REGION X.

work has been completed in twenty-four out of the fifty-six Montana counties.

The lands classed as "farm land" by the United States Geological Survey map are those areas where it was considered that cash crop farming would have a reasonably good chance of success. Lands classed as "farming-grazing" lands were those which would be combined with livestock grazing, in greater or lesser degree, with the emphasis upon feed production rather than upon cash crop production. As will be seen later, when we consider materials showing the present land use pattern of Fergus County, there is much similarity between the types of use which have developed and the types of use indicated as desirable by this mapping. A detailed comparison of this map with Figure 1 shows that certain areas stand out rather clearly. The western part of the county, in which the better grade farm lands are found, is the Judith Basin area which extends westward into the adjoining county.

The various land use areas of the county can be seen much more distinctly when the land classification maps (Figs. 1 and 2) are compared with those showing present utilization. For example, Figure 7 shows the boundaries of the Judith Basin area, which is quite clearly delimited by the present pattern of crop farming. The eastern edge of this area is bounded by the non-farm lands shown in white, with a scattered intermingling of farm and pasture land.

Where the United States Geological Survey classification has been used, it has been checked and supplemented by the crop yield materials which are subsequently discussed in this group of materials.

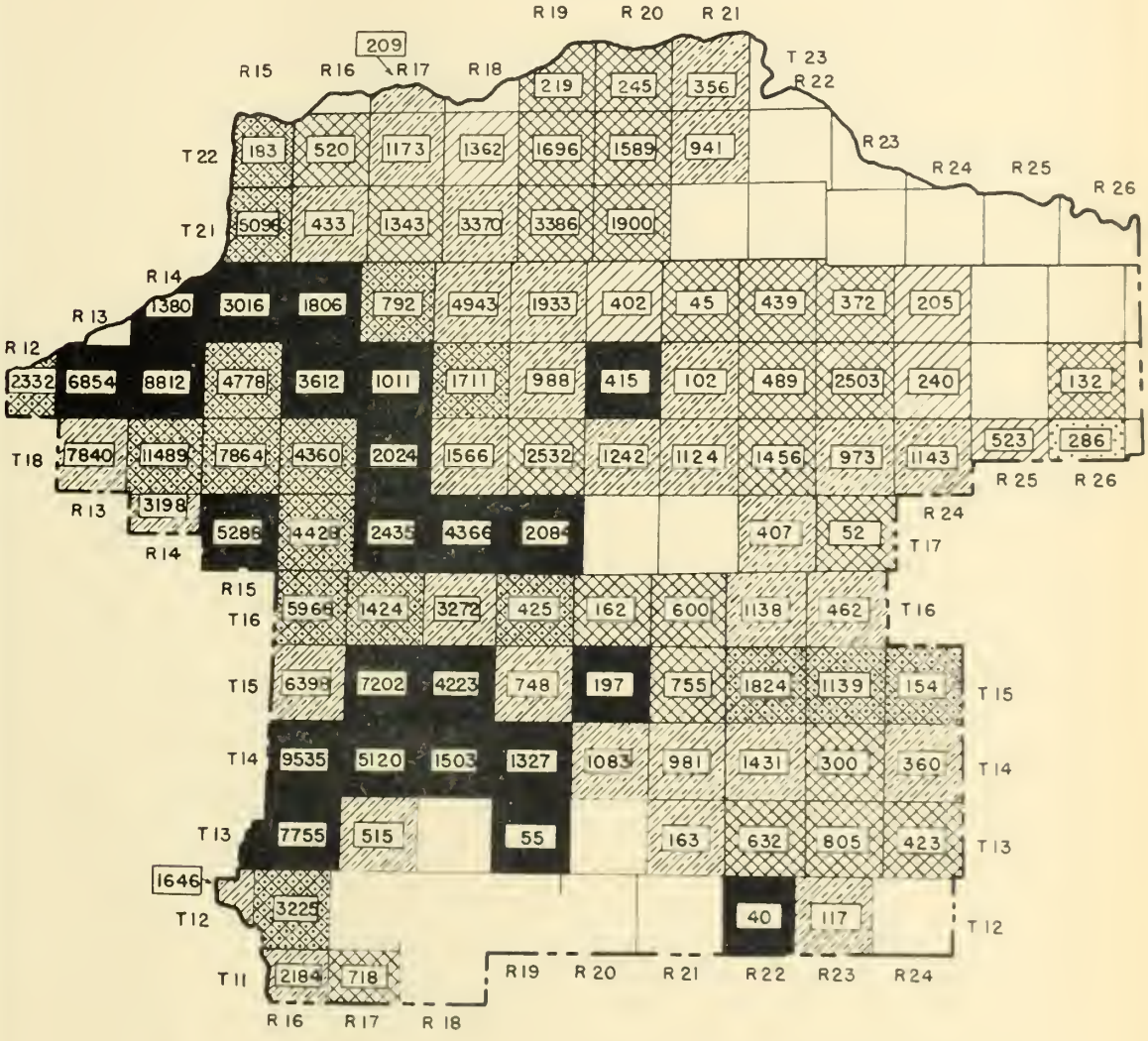
3. Yields per Acre and Acreage of Wheat (Fig. 3). This material was developed from the Agricultural Adjustment Administration's records, and covers the period 1928-1935. Since the wheat yield data shown on this map are not on the basis of alternate summer fallow and crop, the relationship between summer fallow and seeded acreage of wheat was so analyzed that the yield classes shown were roughly comparable with the grade classes used in Figure 1. The significance of this map is that it brings out area yield experience and indicates the weighting of such yield results by showing the average annual seeded acreage per township. This map has been used to supplement and help interpret the classification of materials in Figures 1 and 2.

4. Number of Farms and Average Annual Wheat Production Per Farm (Fig. 4). This material was also prepared from the Agricultural Adjustment Administration's records covering the years 1928-1935. Its purpose is to show the intensity of use of land for crop farming purposes and the size of farm business which has resulted from this use. This has been used to supplement and assist in interpreting the land classifications shown in Figure 1.

5. Soil Erosion Areas (Figure 5). This material was prepared by the Soil Conservation Service and is as of the year 1935. The principal

YIELD PER ACRE
AND
ACREAGE OF WHEAT BY TOWNSHIPS — 1928-1935
FERGUS COUNTY, MONTANA

FIGURE 3



L E G E N D

AVERAGE YIELD PER ACRE

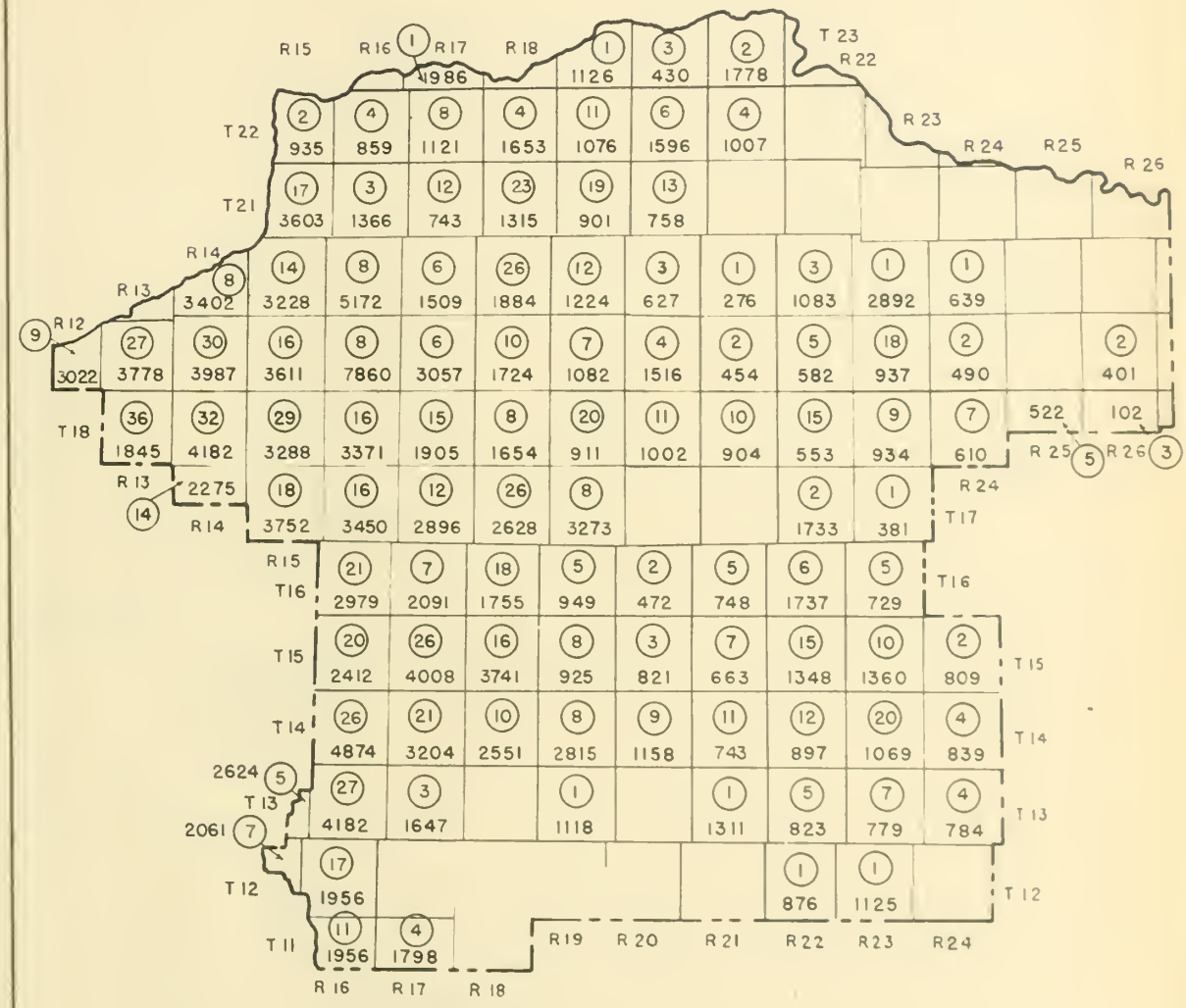
12.5 BU & UP	5.0 TO 7.49 BU
10.0 TO 12.49	2.5 TO 4.99 BU
7.5 TO 9.99	0 TO 2.49 BU

0000 TOTAL NUMBER OF ACRES OF WHEAT PER TOWNSHIP

COMPILED BY THE DEPARTMENT OF AGRICULTURAL ECONOMICS, MONTANA AGRICULTURAL EXPERIMENT STATION, IN COOPERATION WITH THE OFFICE OF THE MONTANA LAND USE PLANNING SPECIALIST, LAND UTILIZATION DIVISION, RESETTLEMENT ADMINISTRATION, REGION X, FROM RECORDS OF THE AGRICULTURAL ADJUSTMENT ADMINISTRATION, U.S.D.A.

NUMBER OF FARMS
AND
AVERAGE WHEAT PRODUCTION PER FARM BY TOWNSHIPS
FERGUS COUNTY, MONTANA

FIGURE 4



L E G E N D

(0) NUMBER OF FARMS IN TOWNSHIP

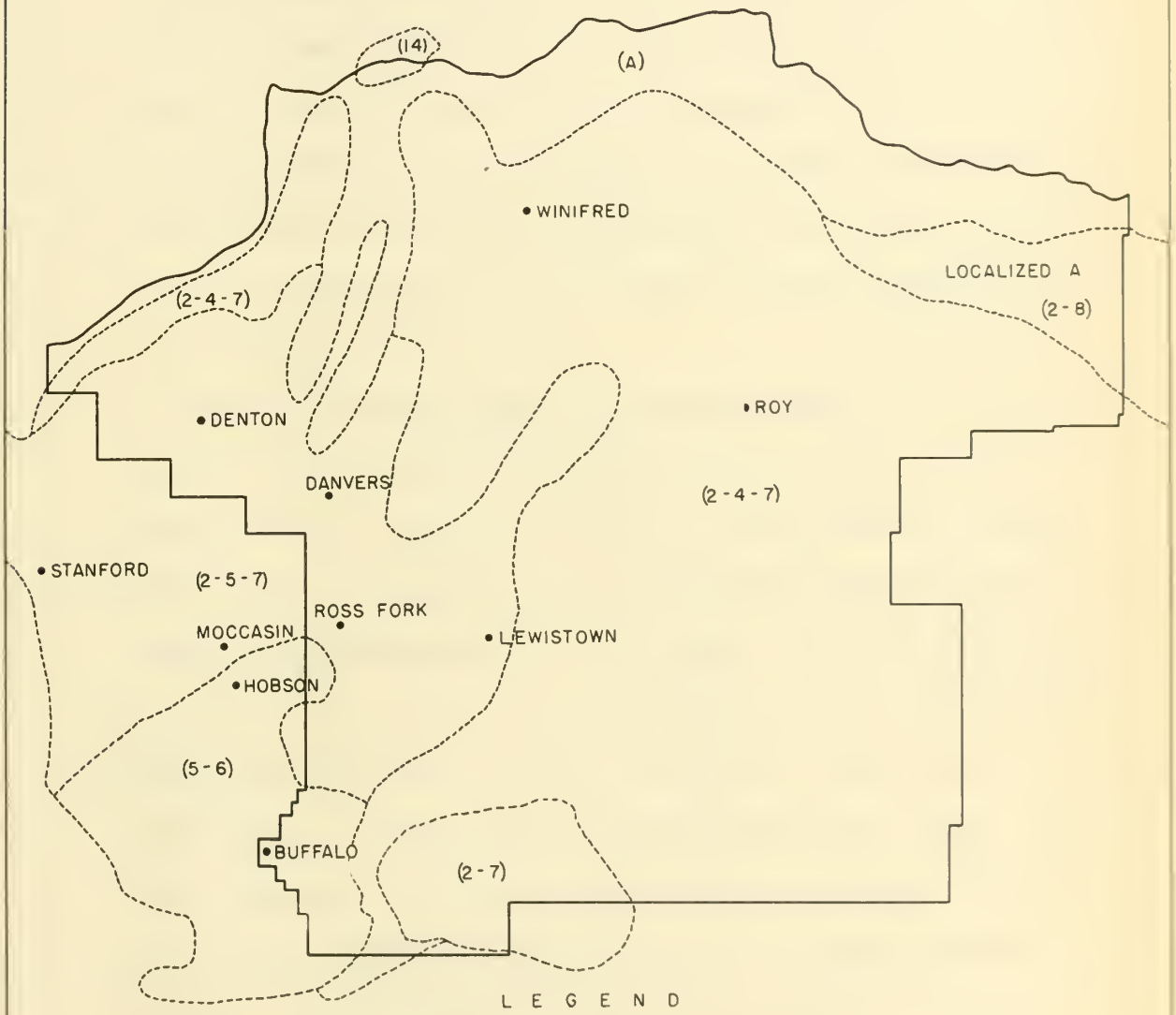
00 AVERAGE BUSHELS PER FARM

8 YEAR AVERAGE (1928 - 1935)

COMPILED BY THE DEPARTMENT OF AGRICULTURAL ECONOMICS, MONTANA AGRICULTURAL EXPERIMENT STATION, IN COOPERATION WITH THE OFFICE OF THE MONTANA LAND USE PLANNING SPECIALIST, LAND UTILIZATION DIVISION, RESETTLEMENT ADMINISTRATION, REGION X, FROM RECORDS OF THE AGRICULTURAL ADJUSTMENT ADMINISTRATION, U.S.D.A.

SOIL EROSION AREAS
FERGUS COUNTY, MONTANA

FIGURE 5



A-MESAS, BADLANDS & CANYONS
2-MODERATE SHEET EROSION LOSS 25 TO 75 TOP SOIL
4-MODERATE WIND EROSION SMALL AMOUNTS OF TOP SOIL REMOVED ACCOMPANIED BY LOCAL ACCUMULATIONS
5-SEVERE WIND EROSION MAJOR AMOUNTS OF TOP SOIL REMOVED USUALLY ACCOMPANIED BY LOCAL DESTRUCTIVE ACCUMULATIONS
6-EXTREME WIND EROSION SOIL LOSSES & DRIFTING TOO SEVERE FOR CULTIVATION
7-OCCASIONAL GULLIES 8-FREQUENT GULLIES

COMPILED BY THE SOIL CONSERVATION SERVICE, U.S.D.A., BASED ON RECONNAISSANCE SURVEY.

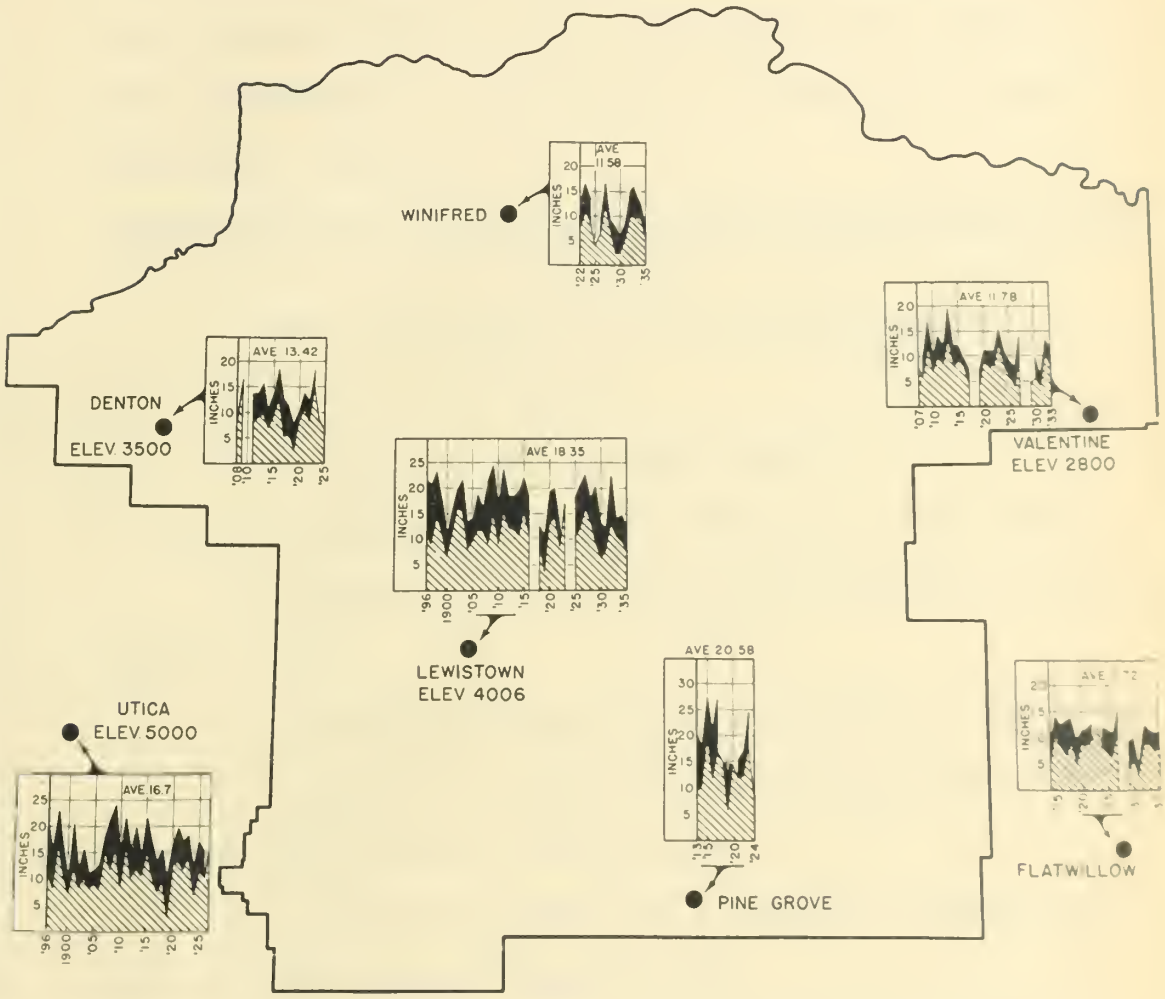
use of this material has been to relate it to an analysis of the organization of farms in parts of the county where soil erosion is indicated as being severe. This has then been used to modify the preliminary analysis as to economic use of farm land areas derived by applying farm management considerations to the land classification material of Figure 1. If, for example, severe erosion is indicated on an area of the better grades of farm land, this modifies the interpretation as to economic use and organization of operating units for such an area.

6. Annual and Growing Season Precipitation (Fig. 6). This was prepared from the records of the United States Weather Bureau. The period covered is probably too brief to show anything conclusive. It would appear to indicate some differences in climatological risk for farming in different parts of the county. The total annual precipitation is the total of black and hatched portions, and the growing season precipitation is shown in hatching. In addition to the greater variability of precipitation for some parts of the county compared with other parts, these data also indicate significant differences in the total amount of precipitation for the period covered by the records. The principal use made of this has been to relate it to crop yield experience in various parts of the county and to the land classification materials shown in Figure 1. It is also indicative of the fluctuations in crop yields under which farm management must attempt to work.

PRECIPITATION

FERGUS COUNTY, MONTANA

FIGURE 6



L E G E N D

COMPILED BY THE DEPARTMENT OF AGRICULTURAL ECONOMICS, MONTANA AGRICULTURAL EXPERIMENT STATION, IN COOPERATION WITH THE OFFICE OF THE MONTANA LAND USE PLANNING SPECIALIST, LAND UTILIZATION DIVISION, RESETTLEMENT ADMINISTRATION, WASHINGTON, AND THE WORKS PROGRESS ADMINISTRATION, FROM U. S. WEATHER BUREAU RECORDS.

There are certain other climatological data which have been considered in various cases but which are not presented here. Among these are length of growing season, and the amount of heat units through the growing season. These latter are, however, of greater importance in connection with the production of specialty crops under irrigation.

Materials Showing Present Land Uses and the Related Agricultural Situation

Types of material presented under this heading are:

1. Land in wheat farms
2. Idle crop land of Fergus County
3. Acreage of summer fallowed land in Fergus County
4. Location, size and income factors of farm and ranch operating units.
5. Location and types of operating units in Fergus County
6. Location of farms with a production probability of less than 1,000 bushels of wheat per year
7. Location of farms with a production probability of 1,000 to 2,000 bushels of wheat per year
8. Location of farms with a production probability greater than 2,000 bushels of wheat per year
9. Gross income probability per farm
10. Ownership of land
11. State grazing districts operating in Fergus County

12. Status of tax payments of Fergus County lands.

13. Farm real estate mortgage indebtedness.

These are the principal materials on present land use which are correlated with the preceding farm management and land resource information, in the delimitation and characterization of areas. The pattern of present land uses has proved to be a most important consideration. These materials on present land use help to delimit the boundaries of natural land use areas, and also show such things as instances in which an economic use of an area has been pushed beyond the capacity of the resources existing in such an area. These materials and the related agricultural situation, when related to farm management and land resource considerations, give the area picture of the indicated adjustments in use of land, type of units, etc.

The types of materials outlined above are arranged in the order of sequence in which they are considered in relation to the preceding analysis of areas. A brief description of each of these materials follows in the order outlined above, together with a brief discussion of the relation of each to other materials.

1. Land in Wheat Farms (Fig. 7). This map shows the dry land farming picture of Fergus County as of the year 1933. It is considered to be approximately 96 percent complete for this type of land use in Fergus County. Comparable material has been developed for the entire State. This material was built up from individual farm maps

LAND IN WHEAT FARMS
FERGUS COUNTY, MONTANA

FIGURE 7

L E G E N D

CROP LAND

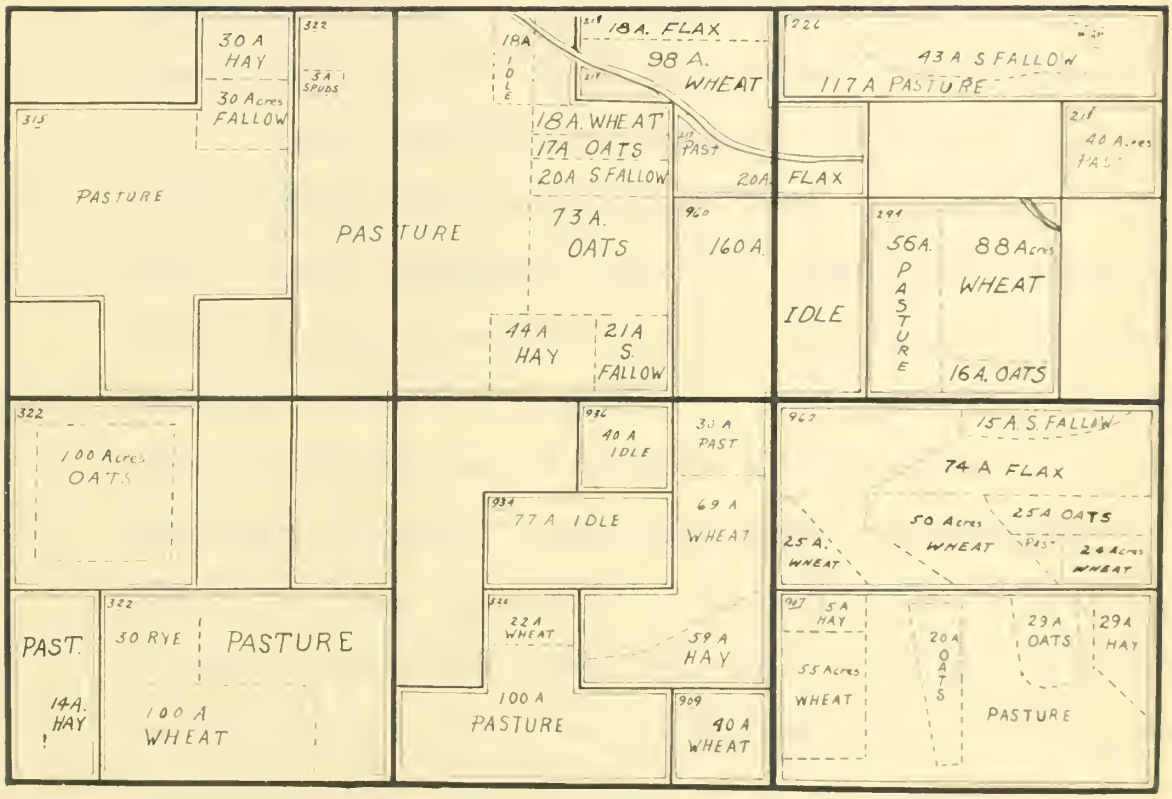
IDLE CROP LAND

PASTURE

COMPILED BY THE DEPARTMENT OF AGRICULTURAL ECONOMICS, MONTANA AGRICULTURAL EXPERIMENT STATION, IN COOPERATION WITH THE OFFICE OF THE MONTANA LAND USE PLANNING SPECIALIST, LAND UTILIZATION DIVISION, RESETTLEMENT ADMINISTRATION, REGION V, FROM RECORDS OF THE AGRICULTURAL ADJUSTMENT ADMINISTRATION, U.S.D.A.

DETAILED LAND USE OF SIX SQUARE MILES
1933
FERGUS COUNTY, MONTANA

FIGURE 7A



THIS MAP REPRESENTS THE FITTING TOGETHER OF THE PRESENT LAND USE (1933) OF THE FARM UNITS IN OPERATION AS TAKEN FROM THE MAPS OF THE APPLICANTS FOR A.A.A. CONTRACTS WHO ARE LOCATED WITHIN THIS AREA OF 6 SQUARE MILES. THERE ARE 14 OPERATING UNITS WITHIN THIS AREA, AND THE NUMBERS ON THE MAP SUCH AS "315" IN THE UPPER LEFT-HAND CORNER INDICATE THE RECORD NUMBER OF THE APPLICANT. THERE ARE SOME AREAS SUCH AS THOSE IN THE EXTREME NORTHWEST CORNER WHICH WERE NOT COVERED BY A.A.A. APPLICATIONS. SUCH LAND MAY BE VACANT AND NON-[illegible] IT MAY BE COUNTY-OWNED LAND, OR LAND WHICH WAS NOT ELIGIBLE FOR INCLUSION IN THE A.A.A. PROGRAM FOR OTHER REASONS. APPROXIMATELY 95 PER CENT OF THE LAND IN OPERATING UNITS PRODUCING WHEAT IN FERGUS COUNTY WAS INCLUDED IN THE A.A.A. PROGRAM.

COMPILED BY THE DEPARTMENT OF AGRICULTURAL ECONOMICS, MONTANA AGRICULTURAL EXPERIMENT STATION, IN COOPERATION WITH THE OFFICE OF THE MONTANA LAND USE PLANNING SPECIALIST, LAND UTILIZATION DIVISION, RESETTLEMENT ADMINISTRATION, REGION V, FROM RECORDS OF THE AGRICULTURAL ADJUSTMENT ADMINISTRATION, U.S.D.A.

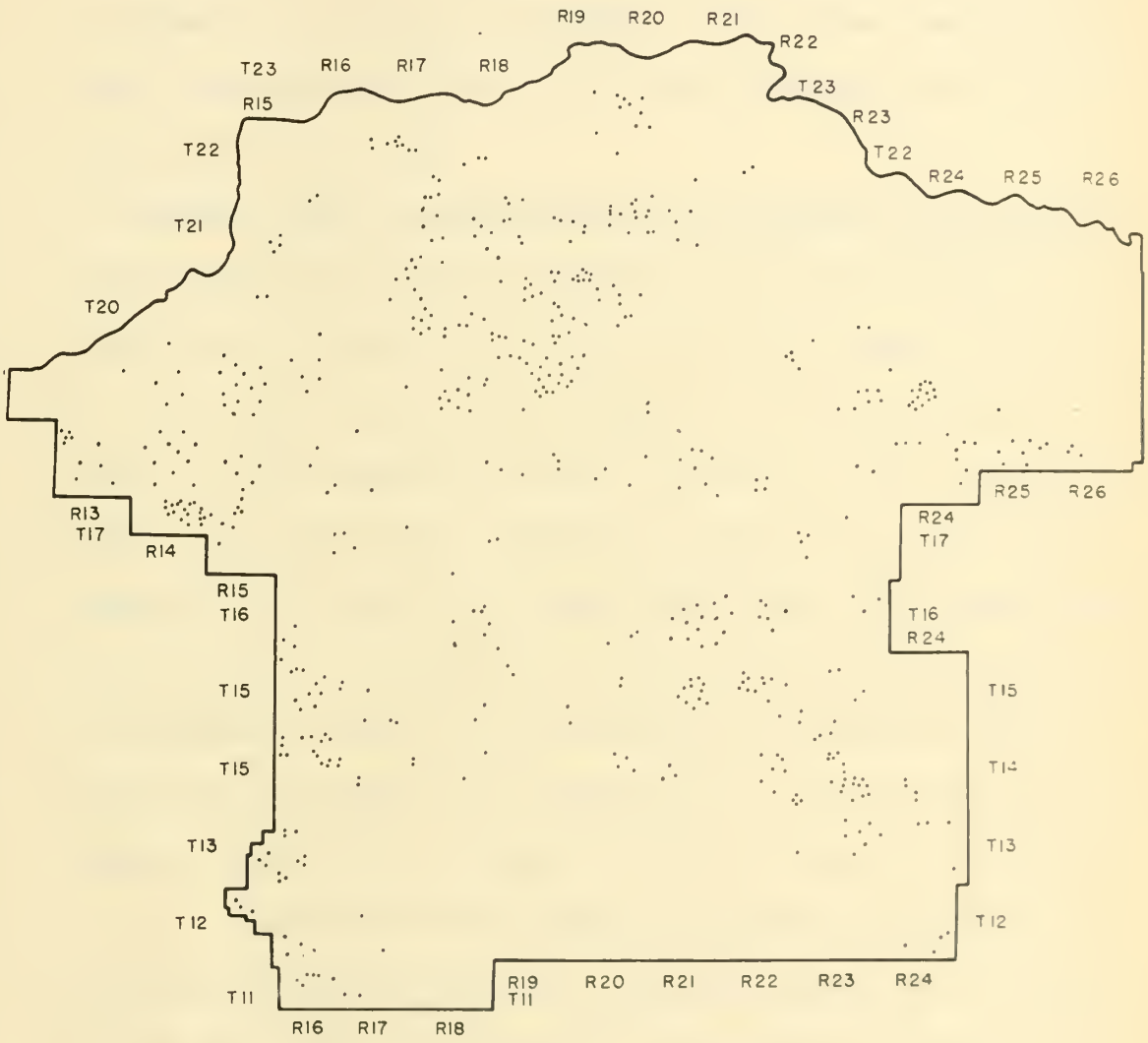
made in connection with A.A.A. contracts. These maps showed the land now in crop use, the idle crop land, and the pasture land down to 10-acre detail. The procedure in building up this map is illustrated in Figure 7a. These maps were first built up into township maps, then into county maps, and were then photographed.

This material shows the more or less distinct farm communities characteristic of the Great Plains. By comparison with Figure 1, some topographic features can be identified. Mountain ranges are interspersed with the farming land in the central and southwestern parts of the county. The non-tillable grazing lands (Fig. 1) constitute most of the white areas on Figure 7. The Judith Basin (in part) is the closely farmed area in the western part of the county. Area No. 1 in the frontispiece and in Figures 17 and 22 takes form as a cash grain area. A distinct farming community can be seen in the west northcentral part of the county (area 2A, frontispiece). Note the grade of farm land upon which area 2A is located. Another farming community (area 6) is in the southeast part of the county, where much pasture land (Figure 1) is associated with the crop land (Figure 7) in these farm units.

2. Idle Crop Land (Fig. 8). This map is used primarily as a supplement to Figure 7, since it emphasizes idle crop land more clearly than in Figure 7, and indicates something of the extent of crop land abandonment and reversion by areas. There are no startling area differences brought out by this map as has been the case in the use

IDLE CROP LAND
1933
FERGUS COUNTY, MONTANA

FIGURE 8



L E G E N D

1 DOT = 50 ACRES

COMPILED BY THE DEPARTMENT OF AGRICULTURAL ECONOMICS, MONTANA AGRICULTURAL EXPERIMENT STATION, IN COOPERATION WITH THE OFFICE OF THE MONTANA LAND USE PLANNING SPECIALIST, LAND UTILIZATION DIVISION, RESETTLEMENT ADMINISTRATION, REGION 8, AND THE WORKS PROGRESS ADMINISTRATION, FROM RECORDS OF THE AGRICULTURAL ADJUSTMENT ADMINISTRATION, U.S.D.A.

of this analysis in certain other counties.

3. Acreage of Summer Fallowed Land (Fig. 9). This material is also from the A.A.A. records and supplements material in Figure 7. A comparison of this map with Figures 1 and 7 shows the relationship between summer fallow practice and the present use of the better grades of farm land.

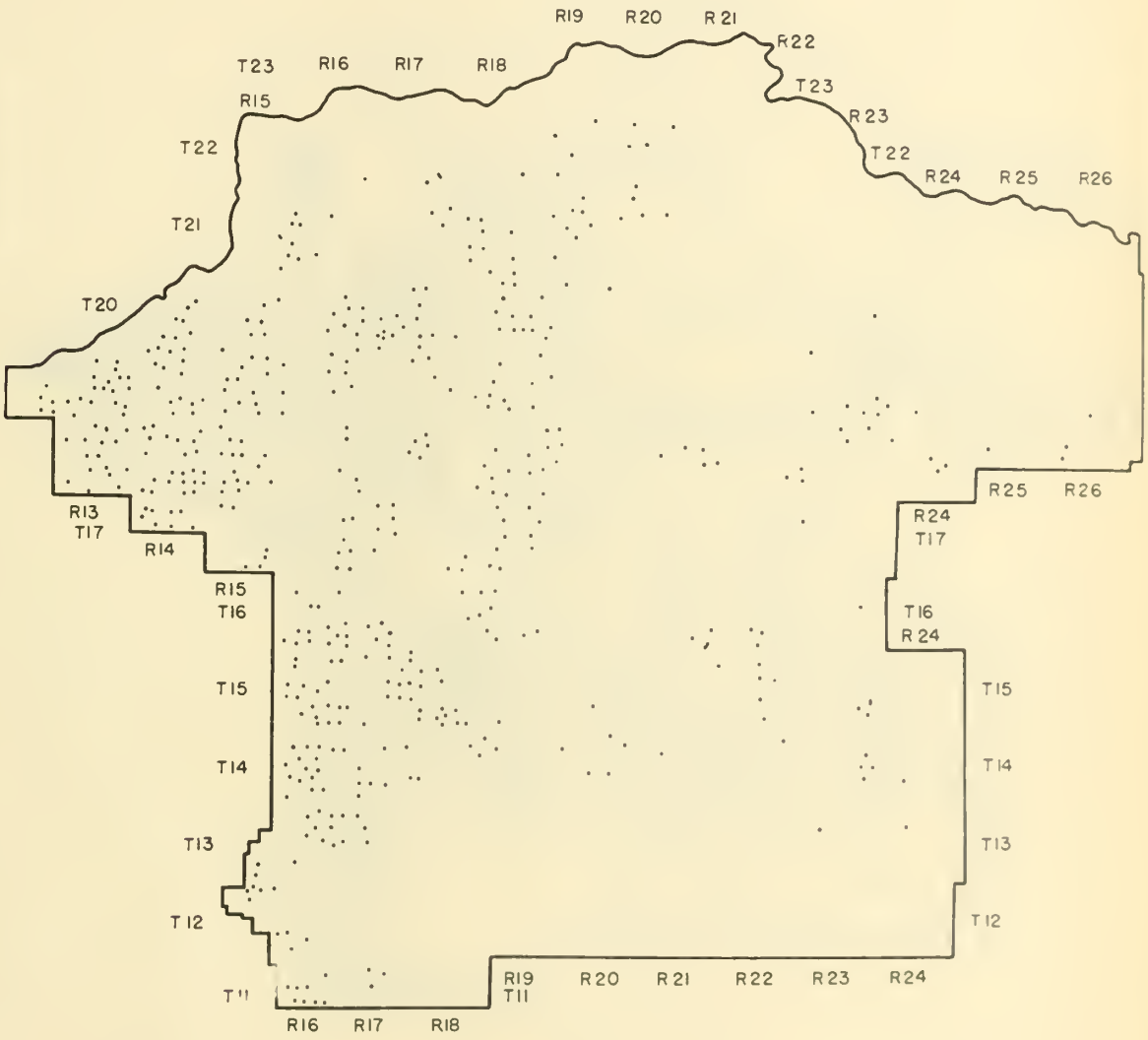
4. Location, Size, and Income Factors of Operating Units (Fig. 10). This map shows for 1934 the location, size, and the production characteristics of every farm and ranch unit in the county. The size of these units is shown both in terms of their surface area and in terms of their probable production of wheat and their livestock numbers. The item of wheat production is based upon the past performance of these units for the period 1928-1932. The livestock numbers are for 1934. In order to show these units in diagrammatic form, it was necessary to show in some instances non-contiguous parcels of land which were part of one operating unit as though they were contiguous. This did not, however, distort the location appreciably.

The parts of this county not covered by operating units are either national forest, as in the southern part of the county, or open land not in operating units. For example, there are some livestock units in the northern and northeastern parts of the county which are operating either on the basis of no control or very little control of land. The symbols used to indicate wheat production, and cattle and sheep numbers, were designed to show the

ACREAGE OF SUMMER FALLOWED LAND

FERGUS COUNTY, MONTANA

FIGURE 9



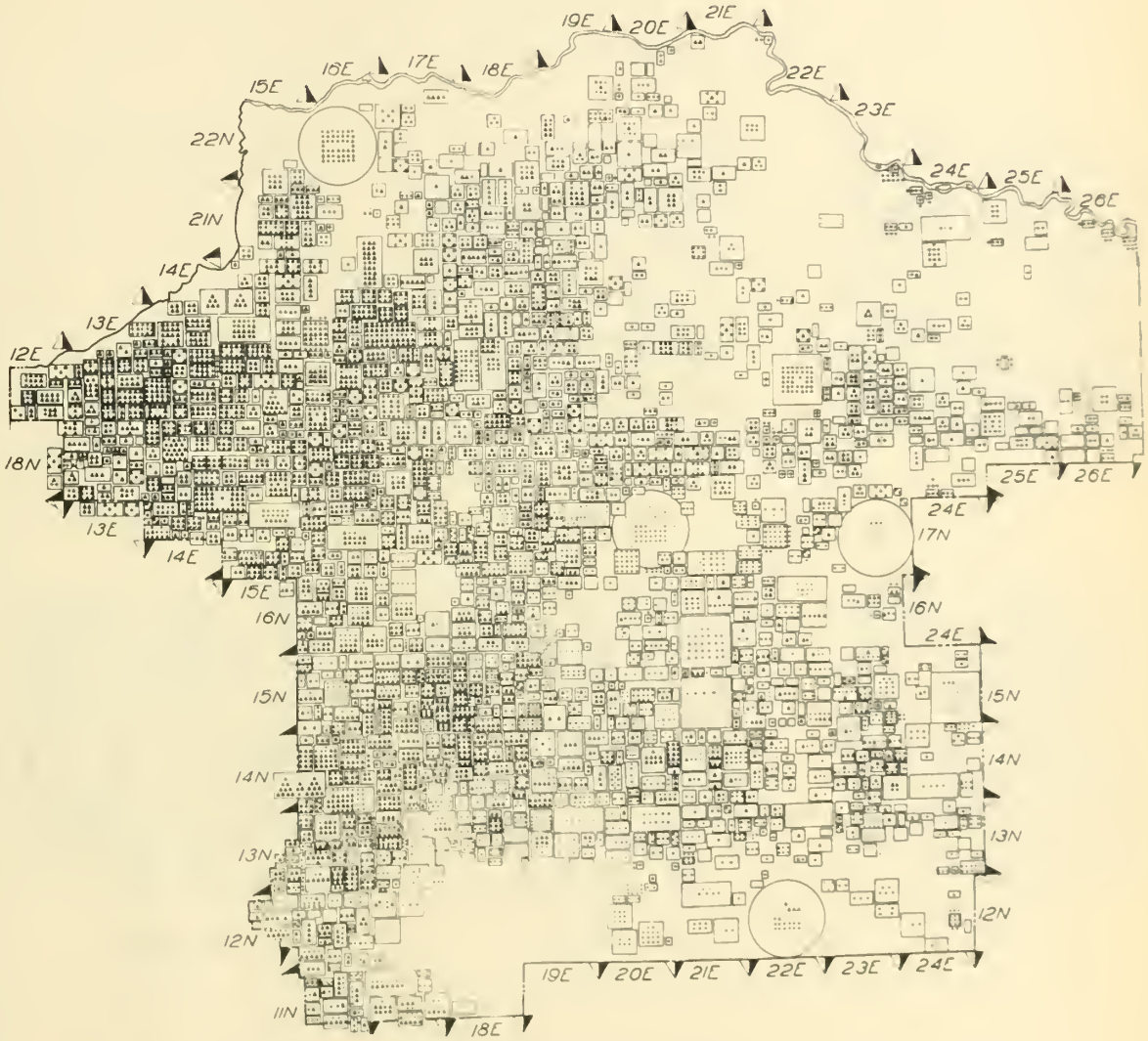
L E G E N D

1 DOT = 200 ACRES

COMPILED BY THE DEPARTMENT OF AGRICULTURAL ECONOMICS, MONTANA AGRICULTURAL EXPERIMENT STATION, IN COOPERATION WITH THE OFFICE OF THE MONTANA LAND USE PLANNING SPECIALIST, LAND UTILIZATION DIVISION, RESETTLEMENT ADMINISTRATION, REGION V, AND THE WORKS PROGRESS ADMINISTRATION, FROM RECORDS OF THE AGRICULTURAL ADJUSTMENT ADMINISTRATION

LOCATION, SIZE, AND INCOME FACTORS
OF
FARMS AND RANCH OPERATING UNITS — 1928-1932
FERGUS COUNTY, MONTANA

FIGURE 10



L E G E N D

+25 BEEF CATTLE	▫ 0-160 ACRES	▭ 640 1,280 ACRES	5,000 TO 10,000 ACRES	10,000 ACRES AND OVER
● 125 SHEEP	▫ 160-320 A	▭ 1,280 2,560 A		
▲ 500 BU. OF WHEAT	▫ 320-640 A	▭ 2560-5000 A		

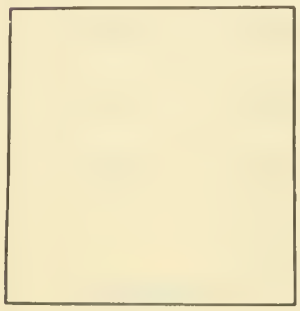
THIS IS A DIAGRAMMATIC MAP WHICH SHOWS THE SIZE AND APPROXIMATE LOCATION OF OPERATING UNITS IN FERGUS COUNTY. THE PRINCIPAL SOURCES OF INCOME FROM THESE OPERATING UNITS ARE BEEF CATTLE, SHEEP AND WHEAT. TWENTY-FIVE BEEF CATTLE, 125 SHEEP, AND 500 BUSHELS OF WHEAT ARE CONSIDERED EQUIVALENT TO EACH OTHER FROM THE STANDPOINT OF GROSS INCOME. THE AMOUNT OF THIS INCOME IS $400 FOR EACH GROUP. TO GET AN UNDERSTANDING OF THIS MAP IT SHOULD BE CONSIDERED IN RELATION TO FIGURE 10A.

FOR THE PURPOSE OF ASSEMBLING ALL PERTINENT DATA RELATING TO EACH OPERATING UNIT, A CARD 8½ x 11 INCHES IN DIMENSION WAS DEVELOPED WHICH PROVIDED SPACE FOR NAME AND LOCATION OF OPERATOR, CROP AND LIVESTOCK DATA, ETC., AS WELL AS A TOWNSHIP PLAT ON WHICH COULD BE LOCATED EVERY PARCEL OF LAND IN EACH OPERATING UNIT. COPIES OF THESE CARDS MAY BE SECURED UPON REQUEST TO THE MONTANA LAND USE PLANNING SPECIALIST.

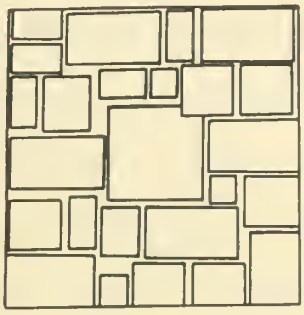
COMPILED BY THE OFFICE OF THE MONTANA LAND USE PLANNING SPECIALIST, LAND UTILIZATION DIVISION, RESETTLEMENT ADMINISTRATION, REGION X, IN COOPERATION WITH THE DEPARTMENT OF AGRICULTURAL ECONOMICS, MONTANA AGRICULTURAL EXPERIMENT STATION.

STEPS TAKEN IN MAKING A TOWNSHIP MAP PRESENTING VARIOUS FACTORS FOR OPERATING UNITS FERGUS COUNTY, MONTANA

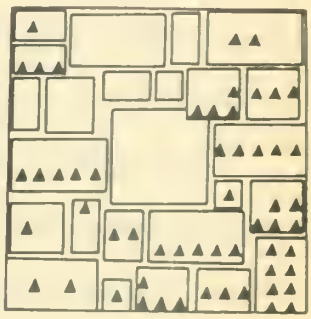
FIGURE 10A



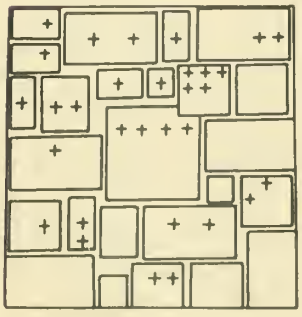
TOWNSHIP



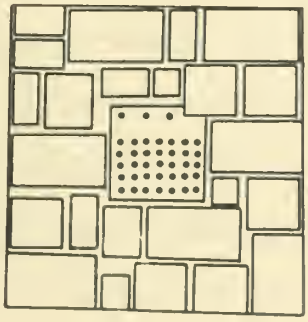
FARMS



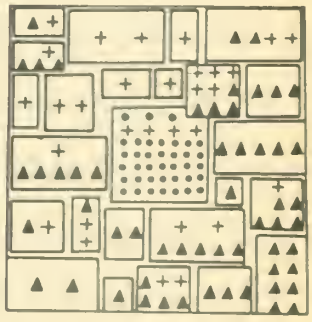
WHEAT



CATTLE



SHEEP



COMPLETE

THE ABOVE ILLUSTRATIONS INDICATE THE METHODS BY WHICH FIGURE 10 WAS DEVELOPED. THE "COMPLETE" TOWNSHIP MAY BE IDENTIFIED ON FIGURE 10, TOWNSHIP 15 – RANGE 16. THE LEGEND WHICH EXPLAINS FIGURE 10 IS APPLICABLE TO THIS ILLUSTRATION.

COMPILED BY OFFICE OF THE MONTANA LAND USE PLANNING SPECIALIST, LAND UTILIZATION DIVISION, RESETTLEMENT ADMINISTRATION, REGION X, IN COOPERATION WITH THE DEPARTMENT OF AGRICULTURAL ECONOMICS, MONTANA AGRICULTURAL EXPERIMENT STATION.

bushels of wheat and livestock numbers which would be comparable from a gross income standpoint, as indicated by farm management data. Each of these symbols indicates a gross income expectancy of approximately $400. Most of the sheep in this county are in range bands on ranches. This type of operation has a higher hired labor requirement in relation to gross income than either farm or range herds of cattle. The gross income from 125 head of sheep is higher than the $400 resulting from 500 bushels of wheat and 25 head of cattle, but due to the higher (paid) labor requirement for sheep compared with cattle and wheat, the 125 head of sheep are roughly comparable.

This map (Fig. 10) gives a picture of the organization characteristics of farms as to the interrelationship between cash crop farming and livestock. In the northern part of the county, for example, is a rather marked degree of association between livestock and wheat. The wheat production per farm, however, is low and a study of land classification data (Fig. 1) indicates that this community could well be associated with grazing district control of adjacent range lands. This will increase the size of livestock enterprises on these farm units which are not too small in terms of acreage but which are too small in terms of income possibilities from their present wheat production and livestock numbers. The farms engaging in wheat production on lower grade farm lands are frequently small both in terms of surface area and size of income (compare Fig. 1).

The map (Fig. 10a) indicates the steps involved in constructing Figure 10.

5. Location and Types of Operating Units in Fergus County (Fig. 11). This is supplemental to the material shown in Figure 10. It brings out more clearly the area differences in farm types based upon income calculations from the same material as used in Figure 10. Any farm receiving over 50 percent of its income from only one source, such as wheat or sheep, was classified as that type of farm. Specialized wheat farms predominate in the Judith Basin area in the western part of the county.

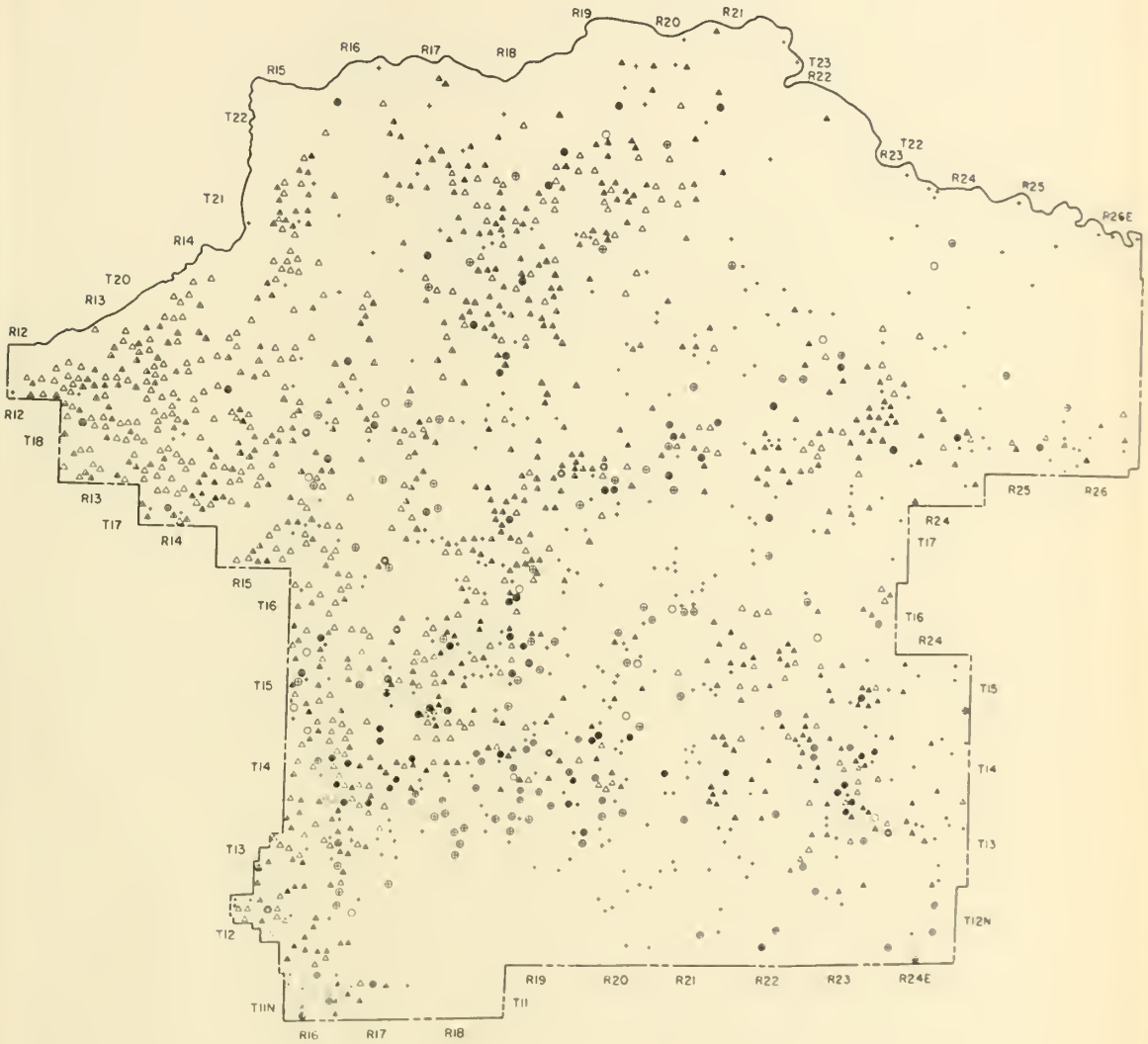
6. Farms Producing Less that 1,000 Bushels of Wheat (Fig. 12). This map was developed from the A.A.A. wheat records covering the period 1928-1935, showing acreage, yield, and production of wheat, and from data on livestock numbers compiled from various sources for the spring of the year 1934. The sources on livestock numbers were Regional Agricultural Credit records, Forest Service records, Federal livestock drought purchase records, and assessor's records.

The purposes in developing this map were:

(a) To give the area picture of farms producing less than 1,000 bushels of wheat only, and having a production probability such that they cannot possibly be economic sized cash grain units. If the yields are good, the adjustment may be changed in size through consolidation, or through a livestock enterprise associated

LOCATION AND TYPE OF OPERATING UNITS
1928 - 1935
FERGUS COUNTY, MONTANA

FIGURE 11



L E G E N D

TYPES OF FARMS

△ WHEAT

○ SHEEP

\+ CATTLE

⊿ WHEAT & CATTLE

⊘ WHEAT & SHEEP

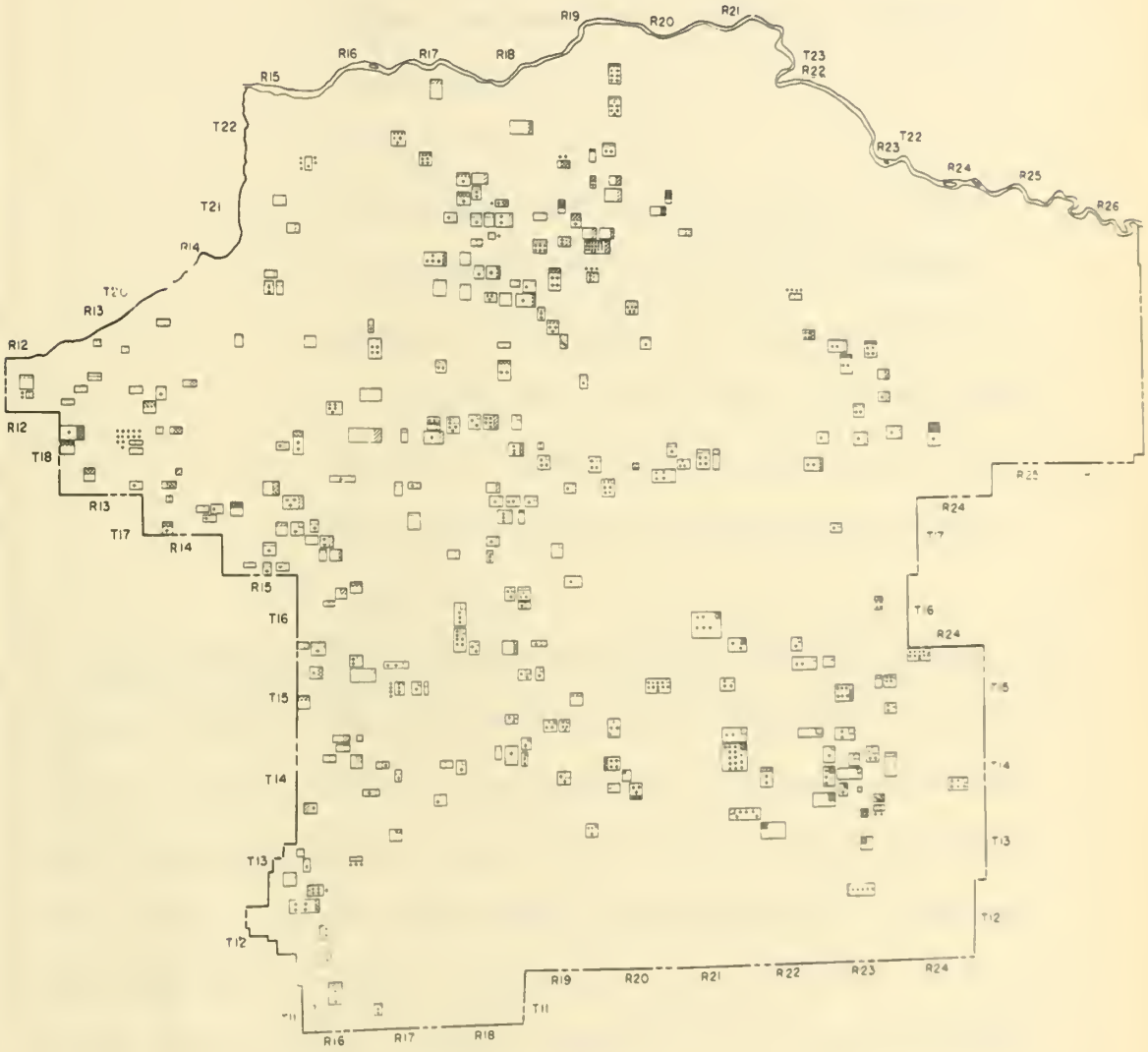
⊕ CATTLE & SHEEP

⊛ WHEAT, CATTLE & SHEEP

COMPILED BY THE OFFICE OF THE MONTANA LAND USE PLANNING SPECIALIST, LAND UTILIZATION DIVISION, RESETTLEMENT ADMINISTRATION REGION X, IN COOPERATION WITH THE DEPARTMENT OF AGRICULTURAL ECONOMICS, MONTANA AGRICULTURAL EXPERIMENT STATION, JULY 1, 1936, FROM RECORDS OF THE AGRICULTURAL ADJUSTMENT ADMINISTRATION, U.S.D.A., REGIONAL AGRICULTURAL CREDIT CORPORATION, FOREST SERVICE, U.S.D.A., FEDERAL RECORDS OF DROUGHT PURCHASE OF LIVESTOCK, AND COUNTY ASSESSOR'S RECORDS.

FARMS PRODUCING LESS THAN 1000 BUSHELS OF WHEAT PER YEAR — 1928 - 1935 FERGUS COUNTY, MONTANA

FIGURE 12



L E G E N D

YIELD PER SEEDED ACRE

- 0 - 2.49 BUSHELS
- 2.5 - 4.99 BUSHELS
- 5.0 - 7.49 BUSHELS
- 7.5 - 9.99 BUSHELS
- 10 - 19.99 BUSHELS
- 20 BUSHELS & UP
- FARM BOUNDARY
- ONE SECTION (640 ACRES)
- 125 SHEEP
- 25 CATTLE

COMPILED BY THE DEPARTMENT OF AGRICULTURAL ECONOMICS, MONTANA AGRICULTURAL EXPERIMENT STATION, IN COOPERATION WITH THE OFFICE OF THE MONTANA LAND USE PLANNING SPECIALIST, LAND UTILIZATION DIVISION, RESETTLEMENT ADMINISTRATION, REGION X, AND THE WORKS PROGRESS ADMINISTRATION, FROM RECORDS OF THE AGRICULTURAL ADJUSTMENT ADMINISTRATION, U.S.D.A., THE REGIONAL AGRICULTURAL CREDIT CORPORATION, FOREST SERVICE, U.S.D.A., FEDERAL RECORDS OF DROUGHT PURCHASE OF LIVESTOCK, AND COUNTY ASSESSOR'S RECORDS.

with adjacent grazing lands or districts.

(b) To show whether a low wheat production probability of farms is due to very low yields rather than small crop acreages, with an indicated adjustment of fewer units and of an entirely different type.

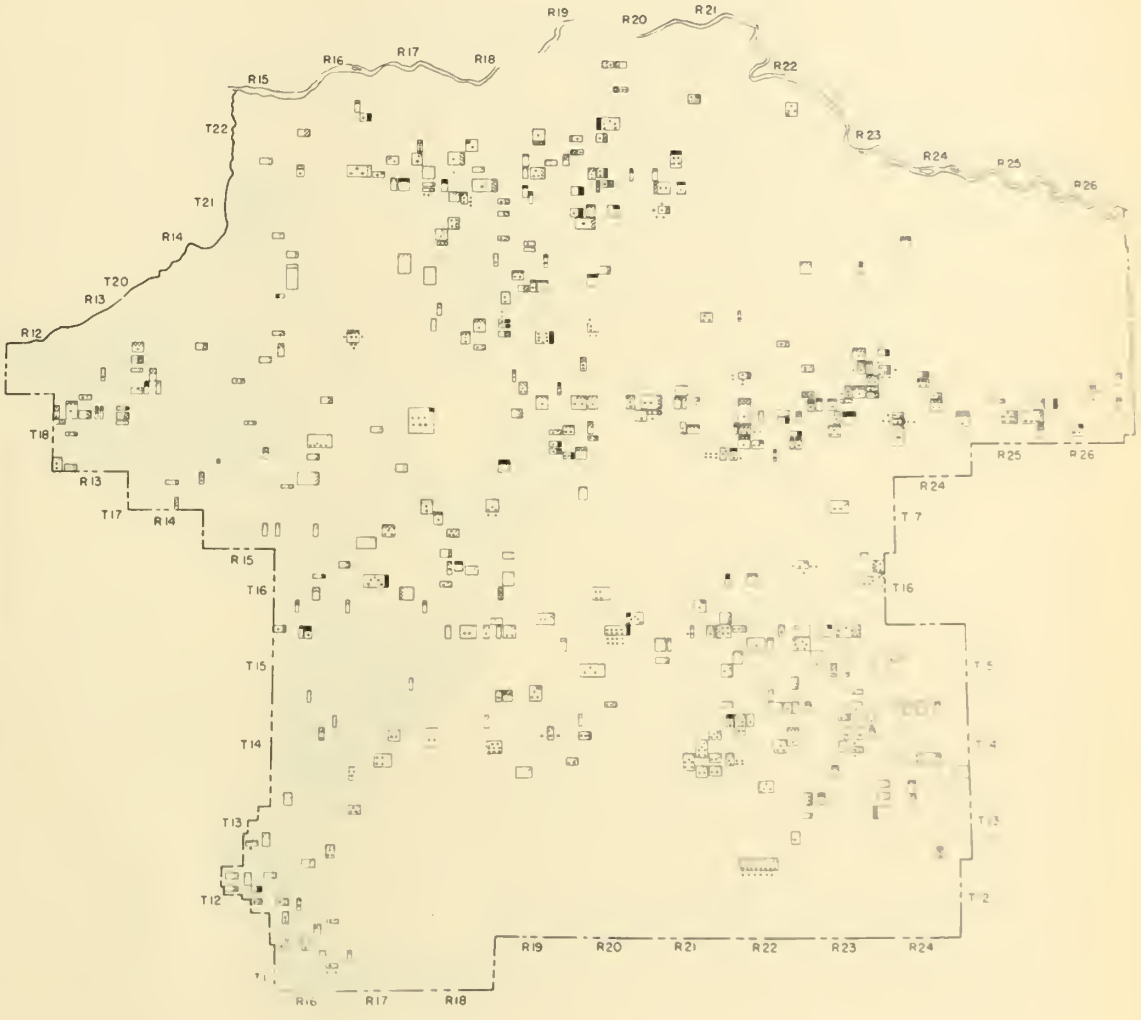
(c) To show any possible area pattern of farms which already have a sufficient livestock enterprise to balance low wheat production. If, in this case, the wheat yields are equivalent to or above those of third grade land, these farms present no particular problem of adjustment.

7. Farms Producing from 1,000 to 2,000 Bushels of Wheat (Fig. 13). This map is derived from the same sources as Figure 12. The purpose is to give a picture of the possible differences and organization characteristics of these farms having a medium wheat production (from 1,000 to 2,000 bushels) as distinguished from those having high and low wheat production. In area 2A (Fig. 17) farms of this size also have a greater association of livestock production than do the farms of the same area of the lower wheat production shown in Figure 12.

8. Farms Producing Over 2,000 Bushels of Wheat (Fig. 14). This map was developed from the same sources as the two preceding. These are the farm units with a wheat enterprise of a sufficient size to

FARMS PRODUCING FROM 1000 TO 2000 BUSHELS OF WHEAT PER YEAR — 1928 - 1935 FERGUS COUNTY, MONTANA

FIGURE 13



L E G E N D

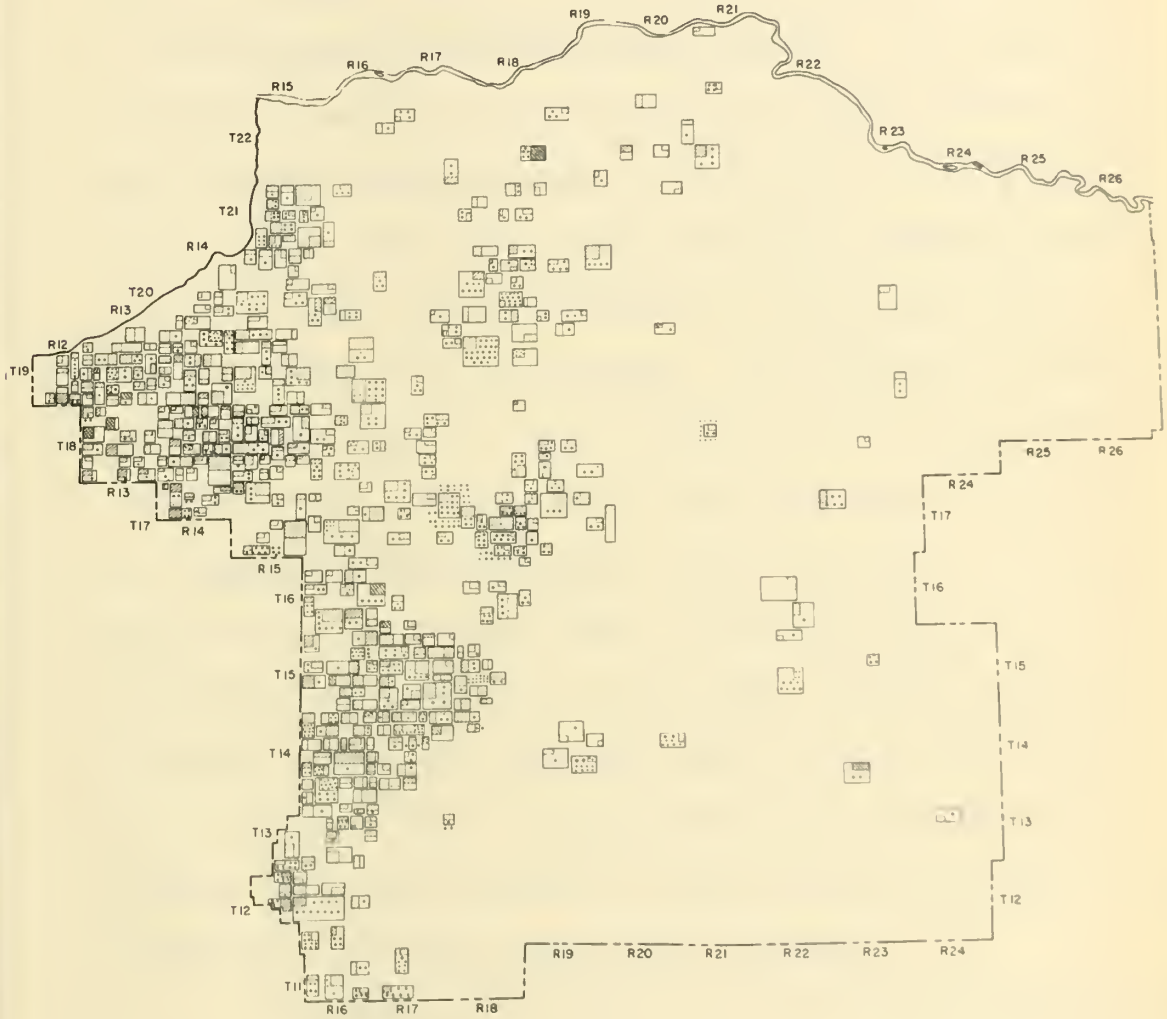
YIELD PER SEEDED ACRE

- 0 - 2.49 BUSHELS
- 2.5 - 4.99 BUSHELS
- 5.0 - 7.49 BUSHELS
- 7.5 - 9.99 BUSHELS
- 10 - 19.99 BUSHELS
- 20 BUSHELS & UP
- — FARM BOUNDARY
- □ ONE SECTION (640 ACRES)
- · 125 SHEEP
- + 25 CATTLE

COMPILED BY THE DEPARTMENT OF AGRICULTURAL ECONOMICS, MONTANA AGRICULTURAL EXPERIMENT STATION, IN COOPERATION WITH THE OFFICE OF THE MONTANA LAND USE PLANNING SPECIALIST, LAND UTILIZATION DIVISION, RESETTLEMENT ADMINISTRATION, GREEN T, AND THE WORKS PROGRESS ADMINISTRATION, FROM RECORDS OF THE AGRICULTURAL ADJUSTMENT ADMINISTRATION, U.S.D.A., THE REGIONAL AGRICULTURAL CREDIT CORPORATION, FOREST SERVICE, U.S.D.A., RECORDS OF FEDERAL DROUGHT PURCHASE OF LIVESTOCK, AND COUNTY ASSESSOR'S RECORDS.

FARMS PRODUCING OVER 2000 BUSHELS OF WHEAT PER YEAR — 1928-1935 FERGUS COUNTY MONTANA

FIGURE 14



L E G E N D

YIELD PER SEEDED ACRE

- 0 – 2.49 BUSHELS
- 2.5 – 4 99 BUSHELS
- 5.0 – 7 49 BUSHELS
- 7.5 – 9 99 BUSHELS
- 10 – 19 99 BUSHELS
- 2 0 BUSHELS & UP
- — FARM BOUNDARY
- □ ONE SECTION (640 ACRES)
- · 125 SHEEP
- + 2 5 CATTLE

COMPILED BY THE DEPARTMENT OF AGRICULTURAL ECONOMICS, MONTANA AGRICULTURAL EXPERIMENT STATION, IN COOPERATION WITH THE OFFICE OF THE MONTANA LAND USE PLANNING SPECIALIST, LAND UTILIZATION DIVISION, RESETTLEMENT ADMINISTRATION, REGION 8, AND THE WORKS PROGRESS ADMINISTRATION, FROM RECORDS OF THE AGRICULTURAL ADJUSTMENT ADMINISTRATION, U.S.D.A., REGIONAL AGRICULTURAL CREDIT CORPORATION, FOREST SERVICE, U.S.D.A., RECORDS OF FEDERAL DROUGHT PURCHASE OF LIVESTOCK, AND COUNTY ASSESSOR'S RECORDS.

be considered an economic sized unit for wheat production alone, if they are located on first, second and third grade farm land. They are largely located on first and second grade farm land.

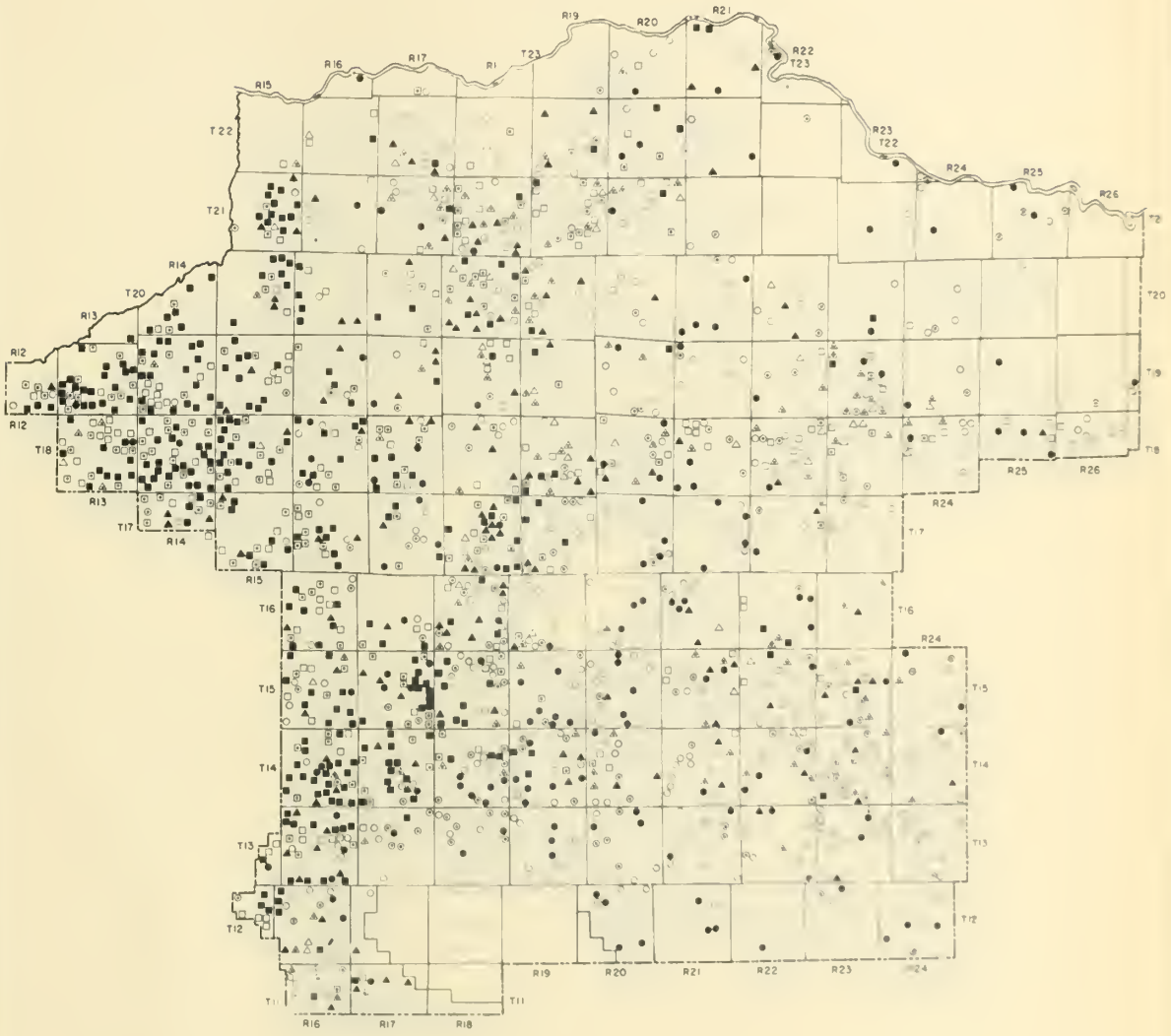
9. Gross Income Probability per Farm (Fig. 15). This map was developed by associating data previously discussed on wheat production and livestock numbers with past price averages. A relationship between numbers of dairy cattle and beef cattle, numbers of sheep, and bushels of wheat, has been determined so that a given number of each has the same gross income expectancy. This material was developed by major farm types. It gives a picture of the possible area relationships of good and poor farm income by these major farm types.

10. Ownership of Land (Fig. 16). This is based upon county and State records for the year 1934. The classification as to "nonresident" means nonresidents of the State. The data upon which this map is based show ownership classes in much greater detail than is presented here. In many cases, in the analysis of this material for Montana counties, it would have been desirable to map the Federal, State and county lands separately.

Significant differences in the ownership characteristics of farm land can be seen for the different areas of the county. Resident ownership generally means operator ownership. Nonresident ownership is likely to mean either open and uncontrolled land or such land under control through lease, which does not have the benefit of owner management over the tenant's operations. Corporate

GROSS INCOME PROBABILITY PER FARM
FERGUS COUNTY, MONTANA

FIGURE 15



TYPE OF FARM	INCOME GROUPS		
	$1,000 AND LESS	$1,001 - $2,000	OVER $ 2,000
WHEAT	□	⊡	■
COMBINATION	△	◬	▲
LIVESTOCK	○	⊙	●

THE GROSS INCOME PROBABILITY PER FARM ILLUSTRATED ON THE ABOVE MAP WAS DERIVED BY CONSIDERIND THAT THE AVERAGE INCOME FROM ONE DAIRY COW, THREE BEEF CATTLE, 15 SHEEP, AND 75 BUSHELS OF WHEAT WERE EACH EQUAL TO $60. THE BASIS FOR THESE VALUES IS FOUND IN FARM MANAGEMENT DATA OF THE AREA, AND REPRESENTS APPROXIMATELY A NORMAL OR LONG-TIME AVERAGE

COMPILED BY THE DEPARTMENT OF AGRICULTURAL ECONOMICS, MONTANA AGRICULTURAL EXPERIMENT STATION, IN COOPERATION WITH THE OFFICE OF THE MONTANA LAND USE PLANNIND SPECIALIST, LAND UTILIZATION DIVISION, RESETTLEMENT ADMINISTRATION, REGION X, AND THE WORKS PROGRESS ADMINISTRATION, FROM RECORDS OF THE AGRICULTURAL ADJUSTMENT ADMINISTRATION, U.S.D.A., REGIONAL AGRICULTURAL CREDIT CORPORATION, FOREST SERVICE, U.S.D.A., RECORDS OF FEDERAL DROUGHT PURCHASE OF LIVESTOCK, AND COUNTY ASSESSORS RECORDS.

OWNERSHIP OF LAND
1933
FERGUS COUNTY, MONTANA

FIGURE 16

L E G E N D

RESIDENT

NON RESIDENT

CORPORATE GROUP

STATE

COUNTY

FEDERAL

THE DATA WERE TRANSFERRED, PARCEL BY PARCEL, FROM THE RECORDS IN THE COURT HOUSE TO TOWNSHIP PLATS, AND WERE LATER ASSEMBLED INTO THE COUNTY PATTERN INDICATED IN THIS ILLUSTRATION. A STATISTICAL SUMMARIZATION OF CLASSES OF OWNERSHIP WAS MADE FROM THE INDIVIDUAL CARDS BRIEFLY DESCRIBED IN CONNECTION WITH FIGURE 10.

COMPILED BY DEPARTMENT OF AGRICULTURAL ECONOMICS, MONTANA AGRICULTURAL EXPERIMENT STATION, IN COOPERATION WITH THE OFFICE OF THE MONTANA LAND USE PLANNING SPECIALIST, LAND UTILIZATION DIVISION, RESETTLEMENT ADMINISTRATION, REGION V, AND THE FEDERAL EMERGENCY RELIEF ADMINISTRATION, FROM RECORDS IN THE OFFICE OF THE COUNTY CLERK AND RECORDER.

ownership, which has a rather high concentration in certain areas, is generally the result of foreclosure by finance companies or individual lenders. This pattern of ownership takes on significance when compared area by area with the map of grades of land in Figure 1 and with the indications on present uses of land previously presented. The concentration of absentee ownership in the northern and eastern parts of the county in relation to the pattern of dryland farming and yields may be seen. Ownership on the basis of homestead entry has probably pushed an attempt at farming even considerably beyond the limits now indicated by Figure 7.

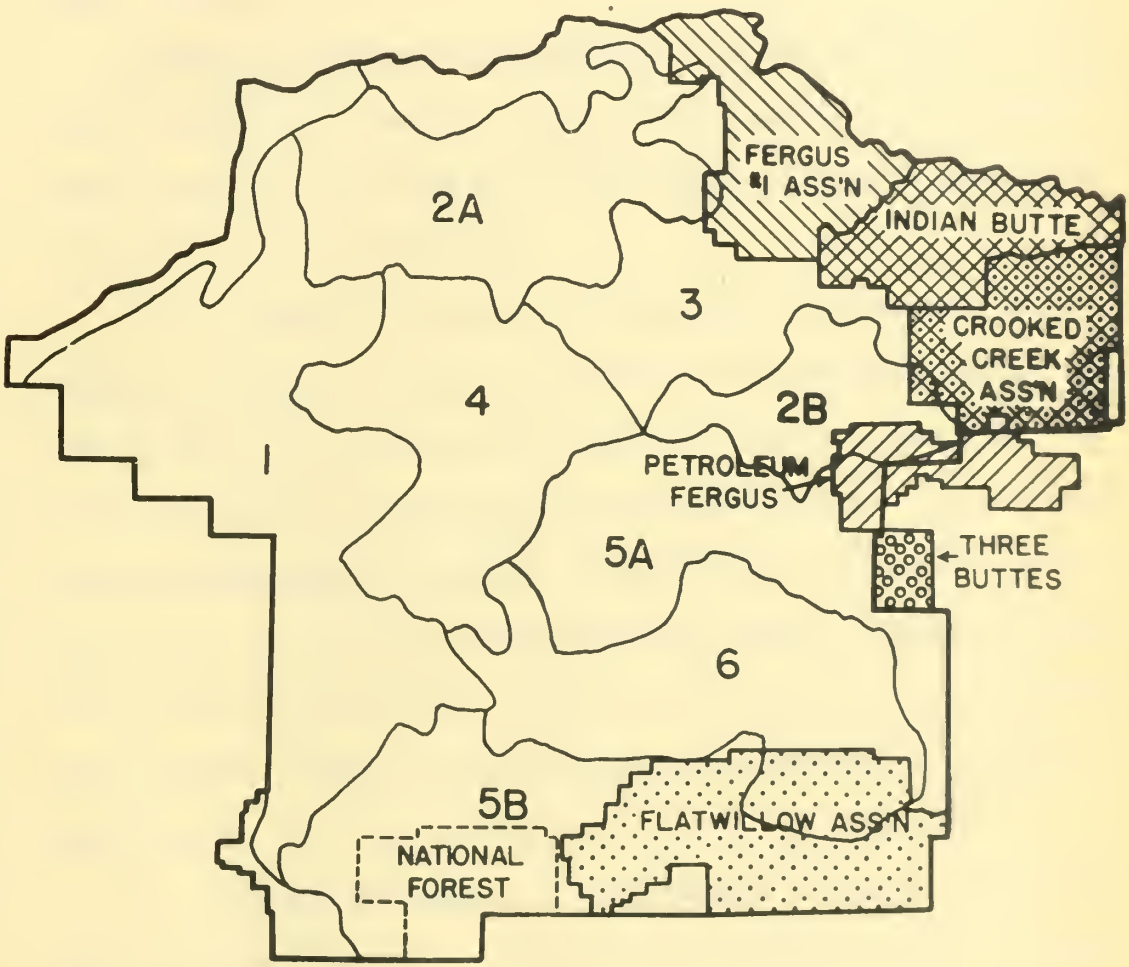
This map has been of great value in planning for the organization of grazing districts. It has been so used along with Figures 7 and 10, which indicate the relationship between ownership, cash crop production, and livestock on farms and ranches.

11. Location of Cooperative Grazing Districts (Fig. 17). These districts have been recently organized under Montana legislation. Each is a cooperative business organization having the power to lease, buy, own, sell, and exchange lands. This legislation provides that counties may lease any lands, to which they take title, to grazing districts for a 10-year period. This becomes especially significant when comparison is made with Figure 18. This brings out the relationship between organization of grazing districts, the present pattern of land ownership, and the potential county ownership.

LOCATION OF COOPERATIVE GRAZING DISTRICTS ESTABLISHED UNDER STATE LAW DECEMBER 1, 1936

FERGUS COUNTY, MONTANA

FIGURE 17



THE AREAS ON THIS MAP NUMBERED 1, 2, 2A, ETC. ARE THOSE ILLUSTRATED IN THE FRONTISPIECE OF THIS REPORT. THE AREAS ON THIS ILLUSTRATION WHICH ARE NAMED, SUCH AS "INDIAN BUTTE", "CROOKED CREEK ASSOCIATION", ETC., EXCEPT "NATIONAL FOREST" ARE GRAZING DISTRICTS WHICH HAVE BEEN ESTABLISHED AND ARE NOW IN OPERATION, OR ARE BEING ORGANIZED IN FERGUS COUNTY UNDER THE AUSPICES OF THE STATE GRAZING COMMISSION. THESE REPRESENT A PART OF THE ADJUSTMENT PROGRAM THAT IS NOW IN OPERATION IN THIS COUNTY WHICH IS INTENDED TO BRING ABOUT CORRECTIONS OF MALADJUSTMENTS IN LAND USE.

COMPILED BY THE OFFICE OF THE MONTANA LAND USE PLANNING SPECIALIST, LAND UTILIZATION DIVISION, RESETTLEMENT ADMINISTRATION, REGION X, IN COOPERATION WITH THE DEPARTMENT OF AGRICULTURAL ECONOMICS, MONTANA AGRICULTURAL EXPERIMENT STATION, FROM DATA OF THE STATE GRAZING COMMISSION OF MONTANA.

Grazing districts are a servicable instrument for effectuating control and management of low grade grazing lands where there is an intermingling of public and private ownership, and also for consolidating complicated patterns of private ownership on intermediate grades of range land, in areas which can support communities of ranch homes.

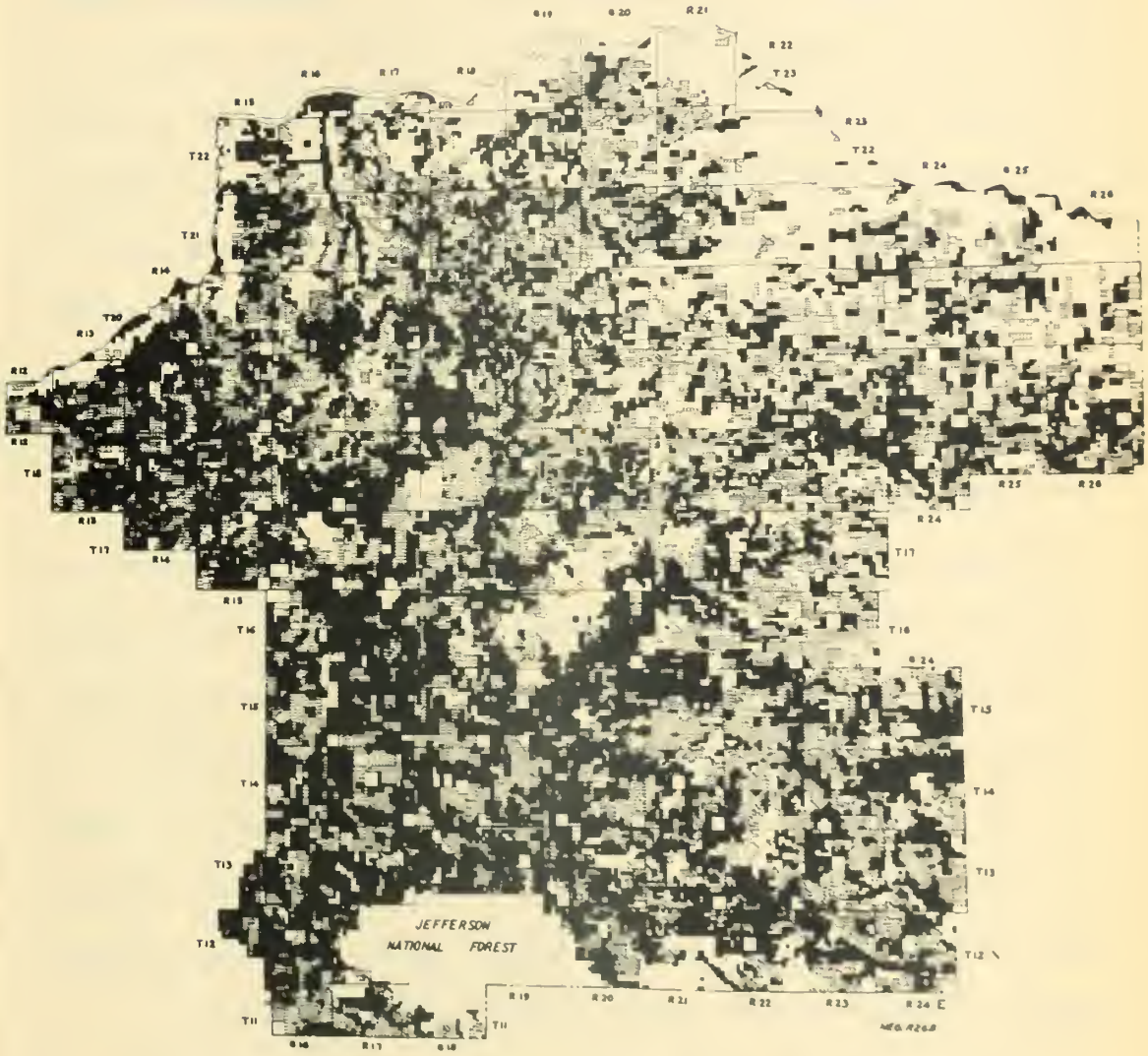
12. Status of Tax Payments (Fig. 18). This map was developed from county records and shows for 1934 the four classes of tax status for lands which are on the tax rolls. The lands in public ownership are indicated in white on this map.

It would be inaccurate to say that the pattern of tax delinquency shown on this map bears any high relationship to improper uses of land. It is indicated by public finance studies that improper classification of land for assessment purposes (for example as between farming and grazing) is an important factor in this respect, and that the lower grade lands are assessed higher in relation to their productivity. There is a fairly significant correlation indicated between the tax payments and extremes of good and poor lands.

This map has been used in getting a picture of the boundaries and characteristics of areas by associating it with the various other map materials. It has been applied to the planning phase of grazing district organization in connection with securing adjustment in the use of lands by tax title procedure and the leasing

STATUS OF TAX PAYMENTS
1933
FERGUS COUNTY, MONTANA

FIGURE 18



L E G E N D

PAID UP

1 YEAR DELINQUENT

2 YEARS DELINQUENT

SUBJECT TO TAX DEED

PUBLIC AGENCIES

PARCELS OF LAND ON WHICH TAXES HAVE BEEN PAID UP TO DATE IN FERGUS COUNTY ARE INDICATED IN BLACK ON THIS MAP, AND THOSE PARCELS WHICH ARE SUBJECT TO TAX DEED ARE SHOWN WITH THE DOT SYMBOL. FOR REASONS WHICH SEEMED ADEQUATE AT THE TIME THIS MAP WAS MADE, THIS METHOD OF PRESENTATION WAS DEEMED SATISFACTORY; MORE RECENTLY THE TAX STATUS OF LANDS HAS BEEN MAPPED IN OTHER STATES WHERE THE LAND WHICH IS SUBJECT TO TAX DEED, OR WHICH HAS REVERTED TO PUBLIC OWNERSHIP BECAUSE OF TAX DELINQUENCY, IS SHOWN IN BLACK, AND THOSE PARCELS WHICH ARE PAID UP ARE SHOWN IN WHITE. THIS LATTER SYSTEM OF MAPPING HAS BEEN ADOPTED RECENTLY IN CONNECTION WITH LAND USE PLANNING WORK IN MONTANA IN CONFORMANCE WITH THE PRACTICE IN OTHER STATES.

COMPILED BY THE DEPARTMENT OF AGRICULTURAL ECONOMICS, MONTANA AGRICULTURAL EXPERIMENT STATION, IN COOPERATION WITH THE OFFICE OF THE MONTANA LAND USE PLANNING SPECIALIST, LAND UTILIZATION DIVISION, RESETTLEMENT ADMINISTRATION, REGION V, AND THE WORKS PROGRESS ADMINISTRATION, FROM RECORDS OF THE COUNTY TREASURER OF FERGUS COUNTY.

of such lands to cooperative grazing associations.

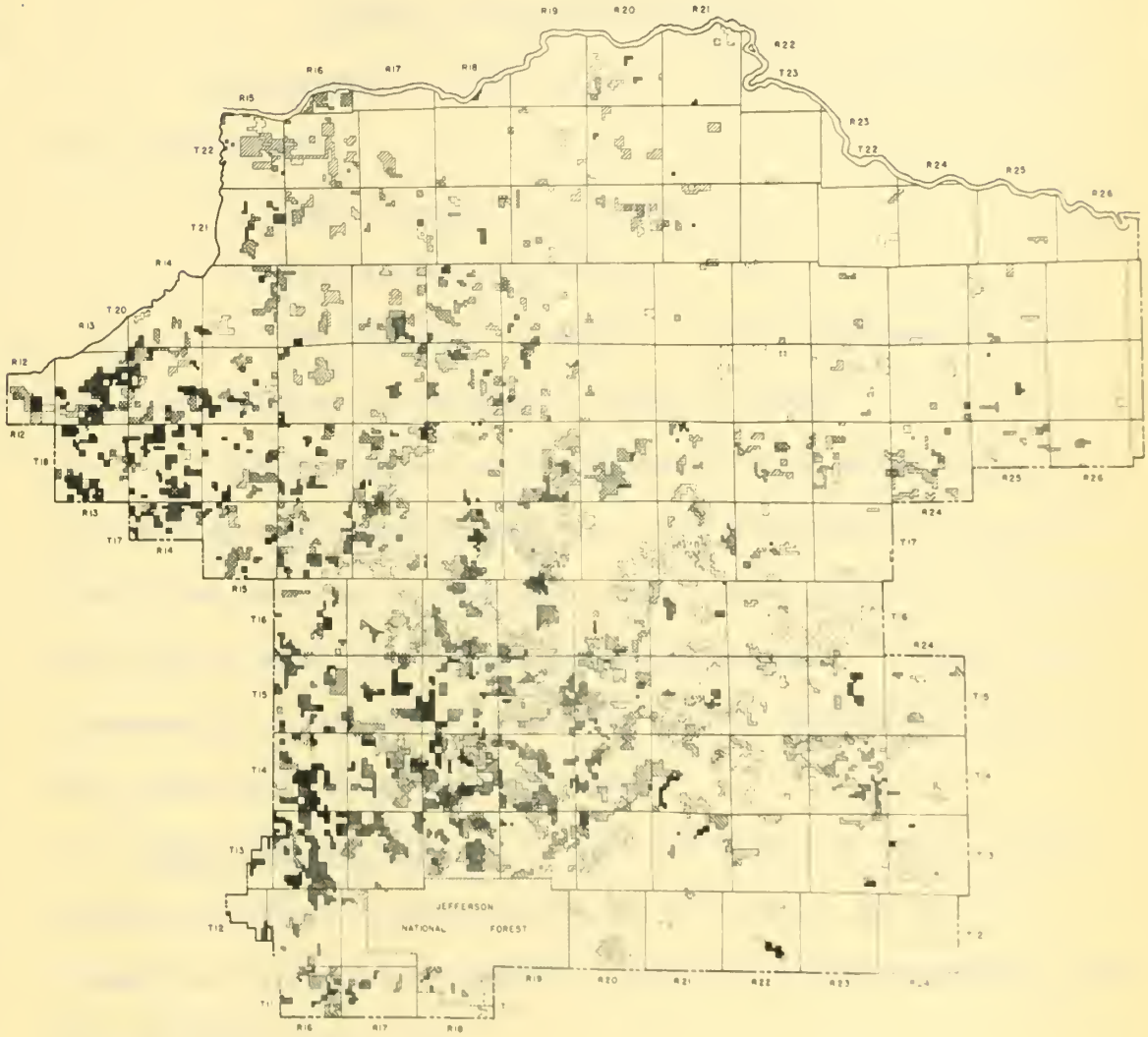
13. Farm Real Estate Mortgage Indebtedness (Fig. 19). This material was developed for the purpose of studying the relationship between indebtedness and the indications from farm management analyses, as to capital values which different grades of farm land can sustain. There are no area differences of any great significance indicated except that of overcapitalization in the southern part of Area 1. Statistical material indicates rather clearly, however, that capital values and indebtedness on the lower grade farm lands are more out of line with their value and debt-paying power than is true of the better lands.

These maps showing present land use, the characteristics of operating units, and the related situation regarding certain other factors, are of primary importance in the analysis and delimitation of areas. In most cases, the present use characteristics are a controlling factor in the delimitation of areas. The information on resources and farm management is then brought in to analyze the suitability of such present use, in which case the area becomes "an adjustment area" rather than an established land use area.

The comparative analysis of only farm management considerations to natural resource facts might make it possible to set up somewhat of an ideal land use area analysis. However, the picture on present land use is not only a necessary guide to the determination of what are established land use areas, but is also necessary

FARM REAL ESTATE MORTGAGE INDEBTEDNESS
BY PARCELS OF LAND JULY 1, 1936
FERGUS COUNTY, MONTANA

FIGURE 19



L E G E N D

DEBT PER ACRE
$ 0.00 TO $ 2.49

$ 2.50 TO $ 4.99

$ 5.00 TO $ 7.49

DEBT PER ACRE
$ 7.50 TO $ 9.99

$10.00 TO $24.99

$25.00 & OVER

COMPILED BY THE DEPARTMENT OF AGRICULTURAL ECONOMICS, MONTANA AGRICULTURAL EXPERIMENT STATION, IN COOPERATION WITH THE BUREAU OF AGRICULTURAL ECONOMICS, U.S.D.A., FROM RECORDS OF THE COUNTY CLERK AND RECORDER.

from a practical standpoint in delimiting areas of homogeneous land use adjustment problems. This can be done only through a comparative analysis of farm management considerations, land resource factors, and the detailed information on present use.

Social and Institutional Factors

The principal materials which will be considered under this heading are:

1. Public facilities and services
2. Population distribution
3. The financial situation of rural governmental units and their services in relation to apparent needs.

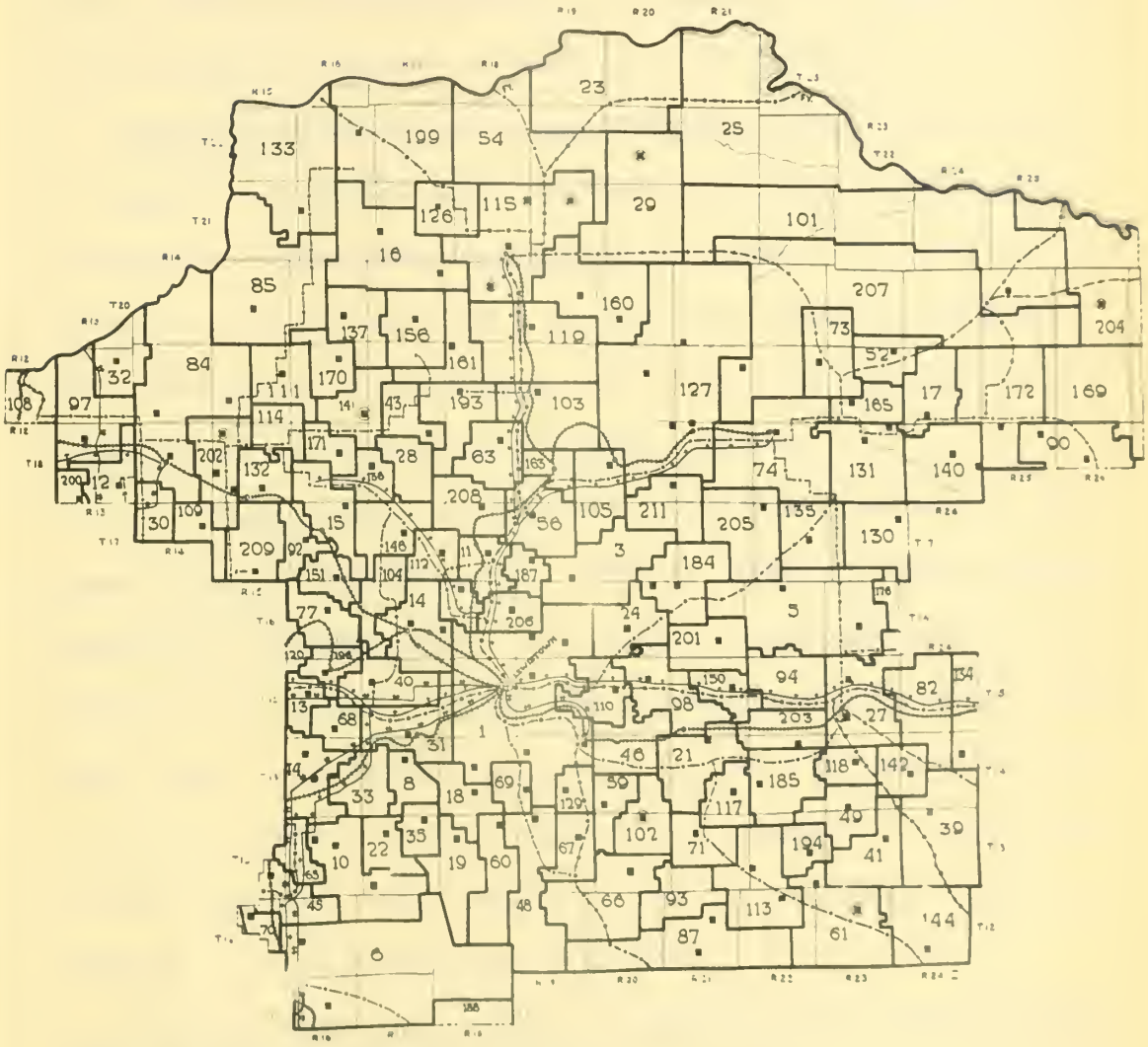
The main objective in the use of these materials is to see what type of community pattern, rural organization, and public facilities exist as an outgrowth of the present pattern of land use, and to make some forecast of possible adjustments. A study of adjustments by areas will of necessity call for some consideration of the social and institutional factors.

1. Public Services (Fig. 20). This map shows the present organization of school districts, location of schools, whether such schools are operating or closed, location of roads, railroads, power and telephone lines, etc.

The size of school districts and the number of schools are about the same in the more extensive type of farm communities in the eastern parts of the county as in the closely farmed communities in

PUBLIC SERVICES
1933
FERGUS COUNTY, MONTANA

FIGURE 20



L E G E N D

- RAILROADS
- PRIMARY COUNTY ROADS
- SECONDARY COUNTY ROADS
- STATE ROADS
- SCHOOL DISTRICT BOUNDARIES
- SCHOOL HOUSES
- LARGER TOWNS
- POSTOFFICES
- POWER LINES
- TELEPHONE LINES

NUMBERS WITHIN THE AREAS BOUNDED BY HEAVY LINES ON THE ABOVE MAP REPRESENT THE NUMBERS OF THE SCHOOL DISTRICTS. IN ADDITION TO THE SYMBOLS INDICATED IN THE LEGEND, THE SQUARES WHICH ARE ENCLOSED IN CIRCLES REPRESENT SCHOOL HOUSES WHICH HAVE BEEN ABANDONED. THE SYMBOL "FY." ALONG THE RIVER AT THE NORTHERN BOUNDARY OF THE COUNTY SIGNIFIES "FERRY".

COMPILED BY THE DEPARTMENT OF AGRICULTURAL ECONOMICS, MONTANA AGRICULTURAL EXPERIMENT STATION.

the western parts of the county. (Compare Fig. 7.) The closed schools are shown on this map as the black squares surrounded by a circle. This information is essential for consideration in planning for the adjustments of some areas, but to use it, standards must be developed on the needs and requirements of communities with various types of intensity of farming and of land use.

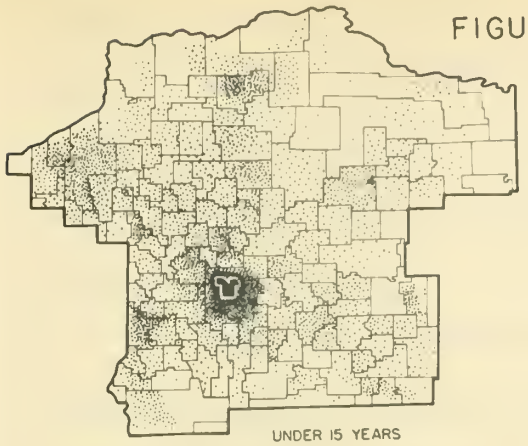
2. Population Distribution by Age Groups (Fig. 21). The dot map of population distribution for the age group under 15 years gives a picture of comparative requirements for grade school services in different parts of the county. In comparing the present and possible development of the county, this material is pertinent to adjustments and reorganization of school services.

These maps do not indicate the community pattern of rural homes as well as does Figure 11. They do, however, contain certain concepts of a usable nature. For example, the sparse nature of settlement in the extreme northern and northeastern parts of the county may be noted. Areas characterized as incapable of sustaining any economical community pattern means that the location of population in such areas must result either in high cost or inferior public services, or some combination of the two.

3. Financial Situation of Rural Governmental Units and their Services in Relation to Apparent Needs. This material is not yet fully developed for presentation, in map and statistical form, for the entire county. The nature of the material being prepared will present a picture of the comparative tax burdens, the indebtedness of rural

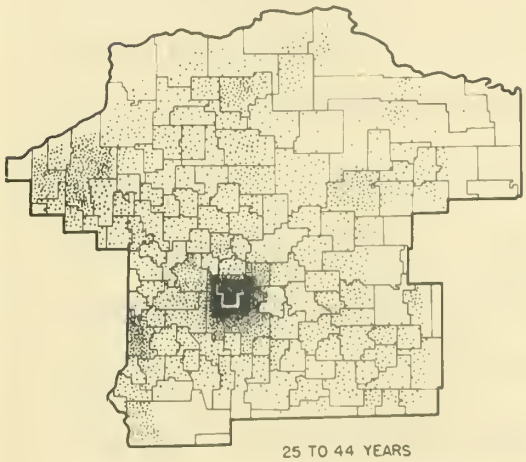
POPULATION DISTRIBUTION BY AGE GROUPS
FERGUS COUNTY, MONTANA

FIGURE 21

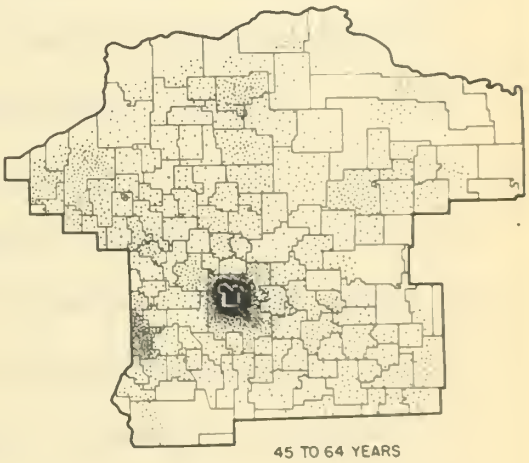


UNDER 15 YEARS

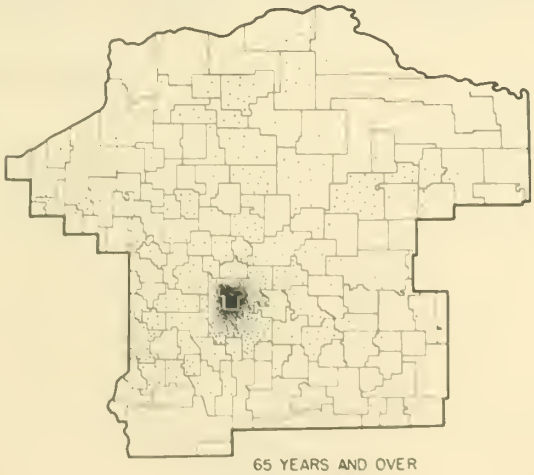
15 TO 24 YEARS



25 TO 44 YEARS



45 TO 64 YEARS



65 YEARS AND OVER

L E G E N D

1 DOT = 1 PERSON

COMPILED BY THE DEPARTMENT OF AGRICULTURAL ECONOMICS, MONTANA AGRICULTURAL EXPERIMENT STATION, IN COOPERATION WITH THE OFFICE OF THE MONTANA LAND USE PLANNING SPECIALIST, LAND UTILIZATION DIVISION, RESETTLEMENT ADMINISTRATION, REGION 8, AND THE WORKS PROGRESS ADMINISTRATION, FROM THE U. S. CENSUS OF 1930.

governmental units, and the costs and efficiency of the various public services rendered. These data indicate a probable future need for planning centralized school services in place of the type now existing in certain areas, and show the possibility of saving a very high proportion of the school costs by rearrangement of school districts and the location of school houses, yet without impairment of services.

There are certain other types of social data which it would be desirable to have if possible. Among these are the detailed information as to the size and age characteristics of families, the location of churches and community centers, and some facts which would make possible a comparative analysis of social participation of the people in various types of rural communities. Such materials, however, have a greater bearing upon certain specialized objectives in sociological research. They do appear, however, to have a valuable bearing in certain respects upon the planning for the institutional and social changes which must result from area adjustments, changes in land use and resulting community pattern for rural homes.

AREAS, POLICIES, AND PROGRAMS

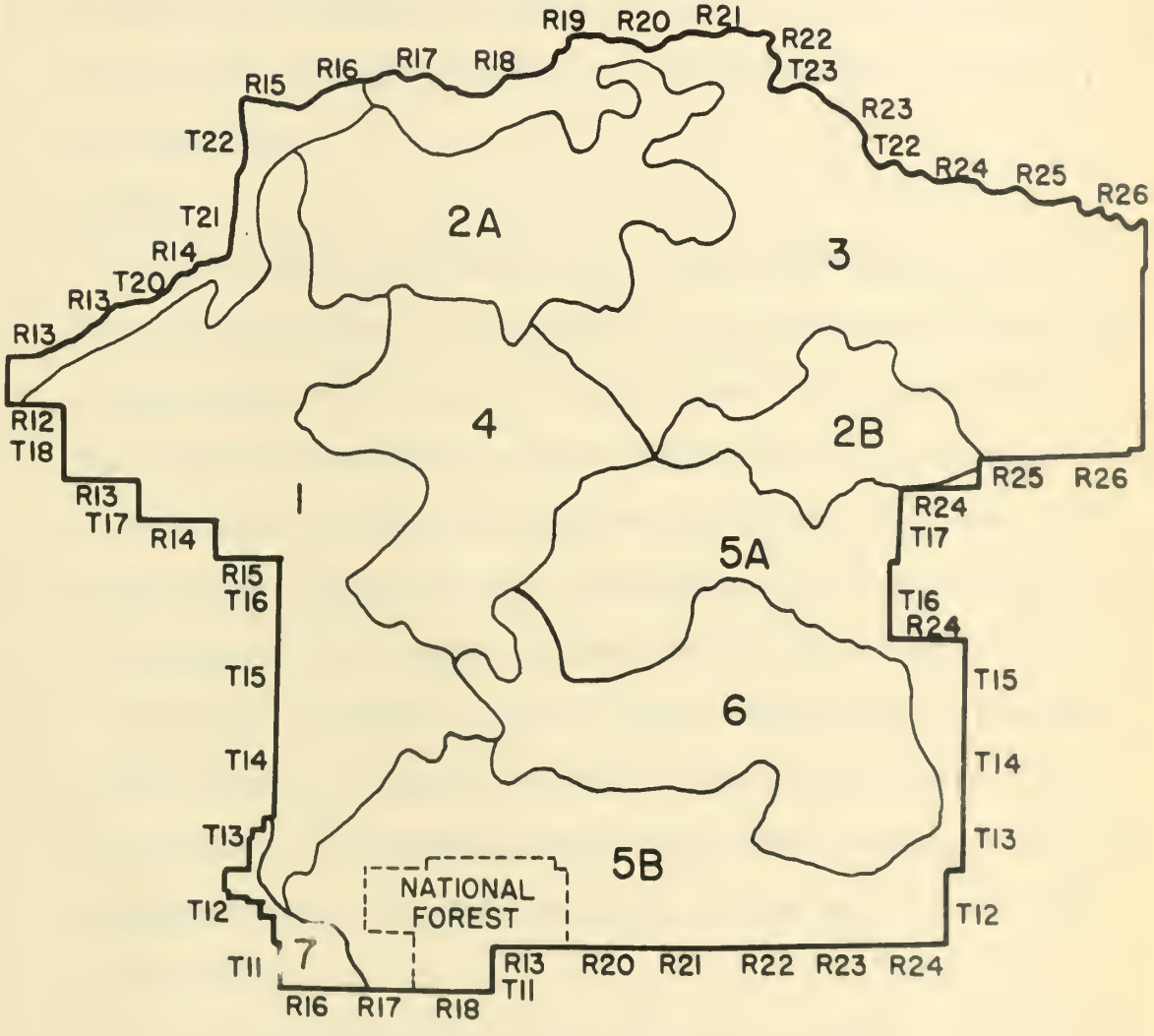
Land Use Adjustment Areas

In Figure 22 are shown the boundaries of areas developed through a comparative analysis by a transparent overlay on the various sets of map materials which have been illustrated and described. The primary consideration in the delimitation of area boundary lines has been the characteristics of the present pattern of use and type of operating units.

This is necessarily the case, since the objective is to analyze the area adjustments involved in the present situation, with an attempt to foresee the type of adjustment measures which will apply to the present situation. The type and grade of land resources and the farm management considerations have been studied in relation to the present land use and operating units pattern in arriving at conclusions on the indicated adjustments. For this part of the procedure statistical summaries were prepared by areas for the various sets of materials which were developed in map form. The map data were the primary considerations in the delimitation of areas. Since, however, the present pattern of land use and the nature of the operating units is conditioned to a large degree by the kind and grade of natural resources, the areas are likely to be coincident with the natural area boundaries of the agricultural resources.

LAND USE ADJUSTMENT AREAS
FERGUS COUNTY, MONTANA

FIGURE 22



FOR EXPLANATION OF THE AREAS, SEE THE FRONTISPIECE AND TEXT

COMPILED BY THE OFFICE OF THE MONTANA LAND USE PLANNING SPECIALIST, LAND UTILIZATION DIVISION, RESETTLEMENT ADMINISTRATION, REGION X.

The purpose of this section is to set forth the characterization of areas as to adjustment problems, and the adjustment procedures and measures which appear to apply. It is suggested that for this section a transparent overlay map of Figure 22 be made for use in connection with area references made to various map materials.

Area 1

This is the "Judith Basin" area, extending westward into the adjoining county. In topography it is an area of rolling benchlands bounded by mountains and rough lands along stream channels. The area includes 400,000 acres in Fergus County. Forty-six percent of this area is classed as first and second grade farm land, 17 percent as third grade farm land, 6 percent as fourth grade farm land, 10 percent as first and second grade grazing land, and 9 percent as third, fourth, and fifth grade grazing. The balance of the area is lakes, streams, mountains, and other unclassified lands. The grazing lands are interspersed with the farm lands, making parts of the area adaptable to livestock production in combination with wheat production.

About 80 percent of the 512 operating units of this area are classed as wheat farms (Fig. 11). These farms follow the practice of cropping wheat two years and summer fallow the third year, with little rotation of other crops. Sixty percent of these wheat farms have a gross income expectancy above $2,000 a year, 25 per-

cent between $1,000 and $2,000, and 15 percent under $1,000. For the combination wheat and livestock farms, these percentages are 72 percent, 20 percent, and 8 percent, and for the stock ranches [1] 40 percent, 25 percent, and 35 percent, respectively. The land ownership of this area is 52 percent resident, 20 percent nonresident, 19 percent corporate, 1½ percent county, 4½ percent State, 2 percent United States, and 1 percent miscellaneous publicly owned.

This area does not have any major problem of change in land use or type of farm units. Wind erosion and declining yields on farm lands is going to necessitate a considerable reorganization of farm operations and practices within the farms in parts of the area. These farms are large enough (the probable average annual wheat production for the wheat farms is approximately 4,000 bushels) so that this change can be accomplished without any serious disturbance of present operating units. Rotating crop land with sod-forming grasses wherever practicable, in addition to tillage practices adaptable to local conditions, will control destructive wind erosion. Adjustments in this area are largely a question of internal farm organization within the control of the individual farm operators. There is very little absentee or "suit case" farm operation in this area, such as complicates wind erosion control in some areas. The present A.A.A. Soil Conservation Program is adapted

1/ Any operating unit where over one-half of the probable gross income is from range livestock is classed as a stock ranch.

to assisting in the erosion control problems of this area.

Area 2-A

This area includes about 210,000 acres of rolling and somewhat broken land in the north central part of the county. The boundaries of the present use development of this area can be seen in Figure 7, which shows an extensive development of cash crop production. There is no first grade farm land in this area. Second grade farm land accounts for one-half of one percent of the surface area; third grade farm land accounts for 8 percent or 17,000 acres; and fourth grade farm land accounts for 22 percent or 46,000 acres. First and second grade grazing land amounts to 4 percent of the area; third and fourth grade, 53 percent, and fifth grade, 11 percent.

About 26,000 acres of the area are devoted to wheat production, some 9,000 acres being on fourth grade farm land. There are 159 operating units, 82 of them classed as cash grain farms, 53 as combination grain and livestock, and 24 as stock ranches. Sixty percent of the cash grain farms have an annual gross income expectancy of less than $1,000, compared with only 22 percent of the combination grain and stock farms. The stock ranches of this area are small, 60 percent of them having a gross income expectancy of under $1,000. The forty-six cash grain farms in the low income group had an average (1928-1935) wheat yield of six bushels per acre, compared with 10 bushels for the higher income groups.

The indicated adjustments for this area are consolidation of operating units, a shift of at least one-third of the cash grain acreage to feed and pasture crops, greater emphasis on farm livestock, and the association of this area as a feed base for the better utilization of Area 3 to the north and east, under State grazing district control. This area has a tenure problem, as only one-third of the area is in owner operation. Rehabilitation credit, accompanied by farm reorganization plans, can do much toward adjustment in this area. Such a program would need to be correlated with the grazing district permit allocation in the adjacent area.

If the present A.A.A.Soil Conservation Program eventually attains the objective now being tried out in experimental counties, it can become an important agency in effecting the adjustment of this area by placing the emphasis upon the diversion of low yielding crop lands to soil conserving feed crops and permanent pasture, rather than upon farm operating practices.

Area 2-B

This area is quite similar to Area 2-A, and consists of a farming community (Fig. 7) on third and fourth grade (Fig. 1) farm land. Precipitation and crop production hazards are comparable with Area 2-A. There are thirty cash grain farms, 38 combination farms, and 19 stock ranches in this area. About two-thirds of the grain farms, one-third of the combination grain and stock farms, and three-fourths of the stock farms have an annual gross income

expectancy below $1,000. Combination grain-stock farms, associated with the adjacent grazing area to the north, is the indicated type of adjustment for this community.

Area 3.

This area includes about 700,000 acres of rough, broken land along the northern boundary and in the northeastern part of the county. This area consists largely of the Missouri River "breaks". An area of similar topographic characteristics has been differentiated from Area 3, along the northwestern boundary of the county. This is part of a larger area in the county to the west, and is not covered in the discussion of Fergus County areas. A small amount of crop farming has developed on the fourth grade farm land in the eastern part of the area (compare Figs. 1 and 7). Six percent of the surface area is classed as third and fourth grade farm land, 3 percent as second grade grazing, 12 percent as third grade grazing, and 79 percent as fourth and fifth grade grazing. The operating units pattern is scattered, and some of the stock ranches are operating on a basis of little or no land tenure (Fig. 10). Thirty-seven percent of this area is owned by the United States (public domain), 9 percent is owned by the county, 7 percent by the State, 6 percent by private corporations, 17 percent by resident individuals, and 24 percent by nonresident individuals.

There are 118 operating units in this area, 11 classed as wheat farms, 9 as combination wheat-livestock farms, and 98 as stock

ranches.

A consideration of farm management resource and public finance data indicates that this area will not support an economic community pattern of operating units. It will find its best use and management in extensive grazing district units and in public ownership. A large acreage, in some cases up to a township (approximately 23,000 acres), of this grade of grazing land resource is required to support one stock ranch operating unit. Livestock grazing has been largely on an "open range" basis in this area, resulting in a carrying capacity considerably below what is possible under good management.

Public acquisition of privately-owned lands through purchase and tax foreclosure, and the use of this area by operators in adjacent areas through grazing district procedure, are the appropriate adjustment measures. This area needs planned development of stock water for use and management of grazing.

Area 4

This area comprises some 315,000 acres surrounding the Moccasin Mountains in the west central part of the county. The topography is very rolling with occasional level benches. Eighteen and one-half percent of this area is classed as first grade farm land, 15 percent as second grade, 6½ percent as third, and 3½ percent as fourth. The percentages for first, second, third, fourth, and fifth grade grazing lands are 14, 15, 6, 1, and 1, respectively. The balance of the area consists of mountainous and other unclassified land.

There are 200 operating units in this area, 78 classed as cash grain, 66 as combination grain and livestock, and 56 as livestock ranches. The farm income status of this area is relatively good, with 40 percent above the $2,000. gross income class and 70 percent above the $1,000 class. About one-half of the land of this area is in owner operation, 18 percent is owned by nonresidents, 22 percent by corporate groups, and 10 percent by public agencies. The corporate ownership represents foreclosure ownership on overcapitalized lands.

There is about 50 percent more first and second grade farm land in the area than is now in cash crop production, due to the fact that these better grade farm lands frequently occur in units too small for crop farming or are associated with pasture lands and have a higher use for feed production. The fact that the 65 largest of the cash grain and combination farms of this area have an average annual gross income expectancy of approximately $4,500 indicates that if the opportunity occurred, there is a possibility of some subdivision of these farms for resettlement and rehabilitation purposes.

Better management practices for control of wind erosion must be developed for farm lands on the higher benches of this area.

Areas 5-A and 5-B

These areas constitute some 600,000 acres of grazing lands,

separated by Area 6. Approximately 5 percent of the two areas is classed as first and second grade farm land, and 8 percent as third and fourth grade farm land. About 12 percent of the area is classed as first and second grade grazing, 17 percent as third and fourth grade grazing, 7 percent as fifth grade grazing, and 30 percent as unclassified timbered grazing land of low carrying capacity. The balance is unclassified mountainous and waste land.

Approximately one-third of this area is in resident ownership, 19 percent nonresident, 21 percent corporate, and the balance is owned by public agencies. The intermingled character of these ownerships can be seen by reference to Figure 16.

There are 75 operating units in Area 5-A and 131 in Area 5-B. One hundred seventy-seven of this total of 206 units are classed as stock ranches, with 8 classed as cash grain farms and 11 as combination farms. Seventy-five, or 32 percent, of the stock ranches fall in the gross income class below $1,000.

Consolidation of operating units through commercial and rehabilitation credit, consolidation of ownership of the lower grade grazing lands through extension of public ownership, and grazing control and management through State grazing district procedure, are the measures which are most important in meeting the adjustment problems of these areas.

Area 6

This area includes about 12 townships (approximately

275,000 acres) of land in the southeast part of the county. The terrain is foothills and very rolling land, and for the most part the area consists of the better grades of farming and grazing lands. This area can be seen clearly on the present land use map. (Fig. 7.) There is a high percentage of pasture land associated with crop land for the farms having A.A.A. contracts. The farm lands are limited in extent and are interspersed with relatively larger areas of grazing land.

The land is largely operated by owners except in the eastern part of the area, which has a relatively high percentage of nonresident and corporate ownership. There is no appreciable amount of public ownership in the area.

There are 210 operating units in the area. Fifty-six of these are classed as wheat farms, 60 as combination wheat and livestock, and 94 as stock ranches. About 45 percent of these 210 operating units have a gross income expectancy of under $1,000.

This area affords the most favorable opportunity for diversification and the production of home living supplies of any of the areas.

Some consolidation of operating units and adjustment in type of farming are the indicated economic changes for this area.

Area 7

This small area in the southwestern part of the county contains about two townships. Most of this area is in the two ad-

joining counties.

There are not enough farms within the Fergus County part of this area to make very much of an analysis of adjustments. It is, however, an area affected by severe wind erosion. The farming lands of this area either have been or are being eroded to such an extent that a program of returning farm lands to sod crops and pasture use appears necessary. This will require an extensive regrassing program and a complete reorganization of the farms toward livestock as the major enterprise.

* * *

In this section on area adjustment policies and programs, the authors do not wish to imply that there is generally a sharp delimitation between areas and their characteristics, or that only the adjustment policies and measures considered in connection with the areas will apply to a particular area. There is necessarily a zone of transition between many areas, and in some cases this transition may be so gradual that the area differentiation becomes an "ideology" for thinking about major land use planning policies and land use adjustment approaches.

The county rather than some other geographic unit was chosen for this illustration in land use planning technique and procedure because in this State, as in most others, the county is an administrative and educational unit through which many of the procedures for change actually operate.

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