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Types of Farming in Idaho

PART I

Agricultural Resources and Factors Affecting Their Use

By

HAROLD A. VOGEL AND NEIL W. JOHNSON

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HAROLD A. VOGEL AND NEIL W. JOHNSON*

RECENT economic changes have had a marked effect upon agriculture. Indications are that the economic situation will continue to have a profound influence upon the future development of the industry. Accompanying this development will be an increased demand for technical advice and information, both from farmers and the semi-public institutions dealing with them. Considerable attention already has been given to programs designed to meet the rising problems of farm adjustment. If these programs are to be effective, they must be based upon adequate knowledge of conditions in the areas for which they are designed.

The level of agricultural development in an area represents the result of continuous effort to adapt prevailing farm organizations to the associated physical, biological, and economic environment. The instability and uncertainty accompanying the early development of farming has provided an accumulated fund of knowledge and experience which serves as a basis for the economical utilization of resources at hand. No program of recommendations should be undertaken without careful consideration of the existing agricultural resources and the uses being made of them by farmers in the area.

Research workers have given too little attention to the identification of the area to which their generalizations apply. Often intensive studies based upon a small number of cases are used in offering specific and detailed recommendations for a large area without due consideration of the degree of uniformity of farming conditions in that area or the applicability of the results to other areas not included in the sample.

Purpose. This type-of-farming series is designed to supply data which may be used as a basis for investigations of adjustment problems confronting Idaho farmers, and is offered as a guide in determining the areas for which specific data may be collected and to which local recommendations apply. Farmers contemplating major shifts in their operations, individuals taking up farms in the state, and agencies depending upon knowledge of agriculture in Idaho for their administrative policies should profit from the use of this material.

*Harold A. Vogel, Assistant Agricultural Economist, Idaho Agricultural Experiment Station, University of Idaho.
Neil W. Johnson, Agricultural Economist, Bureau of Agricultural Economics, United States Department of Agriculture.

Method of Presentation. The first Bulletin of this series deals with the general nature of agriculture in Idaho. Particular attention is given to the land resources, use of agricultural land and the major physical, biological, and economic factors affecting the type of farming in all sections of Idaho.

A second Bulletin, entitled "The Type of Farming Areas," is devoted to a detailed consideration of the various types of farming in Idaho, with an interpretation and analysis of the local factors associated with each type. These two Bulletins are logically followed by local type of farming investigations which serve as the basis for construction of budgets showing the relative profitability of different types of farm organizations in the area.

The material presented in this publication was primarily derived from published and unpublished data taken from the 1930 United States Census of Agriculture. Other valuable sources include the biennial reports of the State Land Department, annual reports of Extension Specialists, the United States Weather Bureau, the United States Forest Service, Bureau of Agricultural Economics, and results published by the Idaho Agricultural Experiment Station.

Because of the existing mass of information relating to each of the 44 counties and the 814 election precincts of the state, the data are largely presented graphically. Maps are used to facilitate comparison of adjoining areas and serve as a basis for the geographic correlation of results. The discussion of each diagram is confined to interpreting the existing relationships. Details for selected areas must be obtained from study of each diagram.

LAND RESOURCES OF IDAHO

Ownership of Land Resources. The land area of Idaho comprises approximately 53,346,560 acres, 79 per cent of which is publicly owned. National forests make up 36 per cent of the area, while 21 per cent is classed as public domain. State land represents 6 per cent and slightly over 1 per cent is in Indian reservations. Other public lands, constituting approximately 10 per cent of the area, consist of unsold lands withdrawn from the public domain for various reclamation projects and other lands set aside for public uses, such as stock driveways, parks, and game reserves. The remaining 26 per cent of the land area mainly represents land in private ownership or land withdrawn from the public domain for that purpose.¹ Figure 1 shows the geological location of the major land holdings and Table I is presented as the estimated area included in each class.²

¹ Unperfected homestead entries amount to more than 2 million acres.

² Many of the divisions of public lands listed in Table I are not contained in the map because of inadequate information regarding their location.

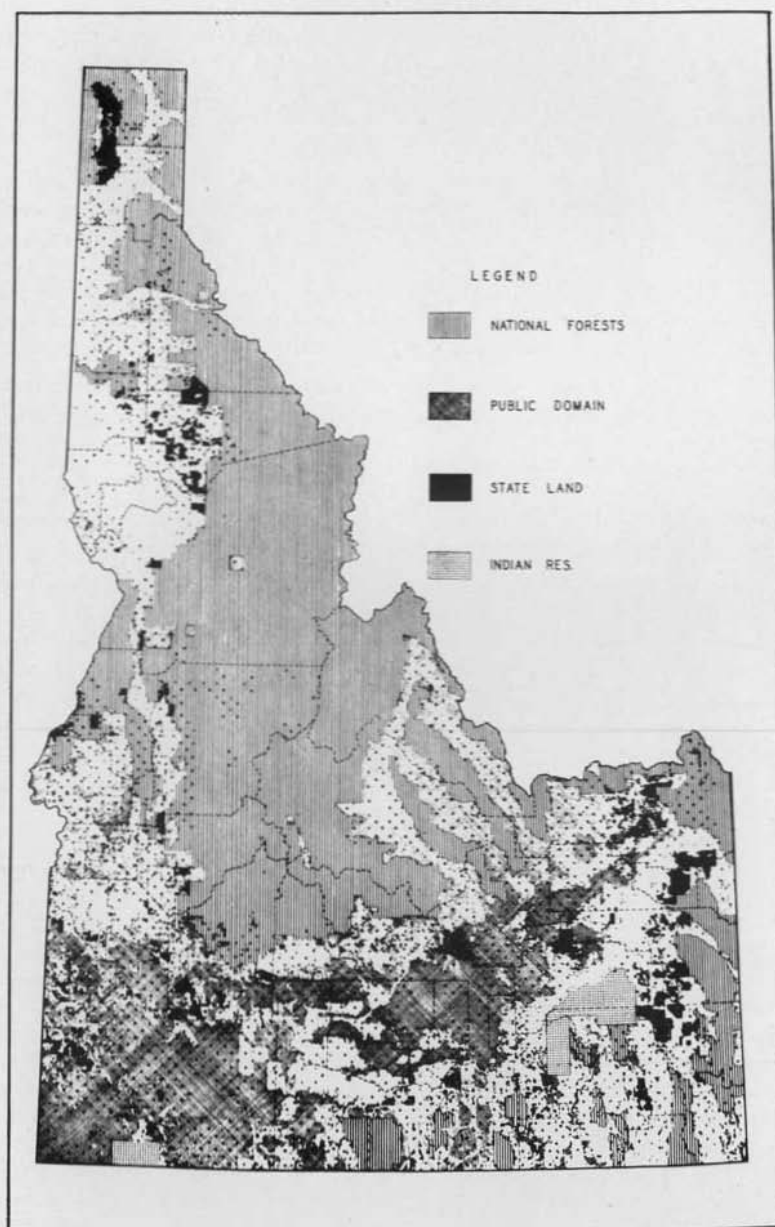


Fig. 1.—OWNERSHIP OF THE LAND RESOURCES. Four classes of public land comprise 67 per cent of the land area of Idaho. Of the total public lands, 51 per cent represents National Forests, 29 per cent Public Domain, 8 per cent State land and nearly 2 per cent Indian Reservations. The unshaded area is mainly privately owned land. The small squares represent school sections.

Characteristics and Use of Public Lands. The area devoted to the 19 national forests in Idaho is generally rough and mountainous. Much of the land is undesirable for private ownership because of topographic, soil, and climatic characteristics, and very little of the area would make desirable farms. Approximately 61 per cent of the standing timber in Idaho is within national forest boundaries but it is estimated that nearly half of this timber has no present commercial value because of its inaccessibility. These forest areas, particularly those in southern Idaho, afford summer grazing for large numbers of cattle and sheep.

TABLE I
Land Classified by Type of Ownership

	(Acres)	(Acres)	Per Cent of Total Area
Public Lands			
National Forests ¹	20,942,145		
Alienated lands ²	1,488,963		
Net forest area.....		19,453,182	36.5
Public Domain ³		10,865,472	20.4
State Lands ⁴		3,110,694	5.8
Indian Reservations ⁵		677,206	1.3
Allotted.....	619,847		
Unallotted.....	57,359		
Federal Reclamation Lands ⁵		2,100,348	3.9
Other Public Lands ⁶		1,708,489	3.2
Stock Driveways and Carey Act Withdrawals.....	991,328		
Power and Water Sites.....	428,253		
Parks, Monuments, and Reserves	105,245		
Miscellaneous Public Lands....	183,663		
Total Public.....		37,915,391	71.1
Private Lands			
Land in Farms ⁶	9,140,291		17.1
Other Private Land ⁷	4,985,156		9.3
Total Private.....		14,125,447	26.4
Ownership Unaccounted for.....		1,305,722	2.5
Land Area of State ⁶		53,346,560	100.0

1 Forestry Almanac 1933, published by American Tree Association. Figures as of July 1931.

2 Alienated lands within National Forests are principally private and state forest lands and mining claims. Small amounts acquired before National Forests were created represent agricultural land.

3 Copeland report, "A national plan for American Forestry." Figures as of June 1932.

4 From statement of State Board of Land Commissioners as of September 30, 1932.

5 From Report of Commissioner of Conservation to the President, January 1931.

6 U. S. Census 1930 corrected for public holdings of farm land.

7 From Biennial reports of State Treasurer and Assessors. 1930-32.

The public domain represents lands still open for settlement under the Homestead Act. Nearly 98 per cent of this land lies south of the Salmon River in an area of insufficient moisture for crop production without irrigation. Only 9 per cent of the area is timbered, the vegetation consisting largely of sage brush, bunch grass, and allied plants typical of arid regions of the west. The public domain is used mainly for spring grazing or range livestock, during which season it is usually well watered by small streams and temporary ponds caused by the melting snow. While the vegetation is fresh, it represents an excellent feed for young livestock, but as soon as hot weather ripens the feed, it becomes practically unuseable.

The state-owned land is widely distributed in relatively small holdings. Most of this land was granted to educational, charitable, and other public institutions. Slightly over 5 per cent of this land is under agricultural leases, most of which is situated in Bonneville, Fremont, Madison, Power, and Teton counties. A large portion of the state land located in northern Idaho is forested. The largest holdings representing a total of over 320,000 acres of excellent timber are found east of Priest Lake in Bonner and Boundary counties and in the Clearwater district.

Land in the Indian reservations has some of the characteristics of all other classes of land in the state. A small proportion is irrigated, part of it is timbered, some of the land in the higher elevations is in dry land farms, and a large amount is grazing land ranging in quality from desert to high capacity range. The irrigated farming area of Bingham county represents the only important crop producing region on reservations.

The use made of public lands has considerable influence upon agriculture. The range livestock industry is built around the available grazing lands. Irrigation projects depend upon the conservation of watersheds for an adequate supply of water. The more remote areas rely on forestry and mining as an outlet for their products, while many farmers obtain employment in these extractive industries for part of their income. Although this interdependence of industry exists, competition for the use of land is not a serious problem at present. The relationship among the various uses of public and private lands is mainly complementary with the limiting factors closely associated with the natural characteristics of the area. Approximately 39 per cent of the total land area is forested, 36 per cent is primarily grazing land, and less than 8 per cent is cultivated. Comparison of public and private holdings reveals that 46 per cent of the public lands and 15 per cent of private lands are devoted to forest use. Table II indicates the uses made of land held under the several types of ownership in Idaho.

TABLE II
Major Uses of Land Resources in Idaho

	(Acres)	(Acres)	(Per Cent)
Public Lands			
National Forests ¹		19,453,182	100.0
Commercial timber.....	7,392,200		38.0
Non-commercial timber.....	7,431,662		38.2
Grazing and barren.....	4,629,320		23.8
Public Domain ²		10,865,472	100.0
Commercial timber.....	537,000		4.9
Non-commercial timber.....	421,000		3.9
Grazing and barren.....	9,907,472		91.2
State Land ³		3,110,694	100.0
Commercial timber.....	958,000		30.8
State Park.....	5,505		2
Agricultural leases.....	168,176		5.5
Grazing leases.....	1,396,220		44.8
Other state land.....	582,793		18.7
Indian Reservations ⁴		677,206	100.0
Timbered lands under super- vision.....	58,675		8.7
Grazing lands.....	428,896		63.3
Irrigated farms.....	34,991		5.2
Other land.....	154,644		22.8
Private Lands			
Total Land in Farms.....		9,140,291	100.0
Crop land.....	3,869,098		42.3
Plowable pasture.....	378,986		4.1
Woodland pasture.....	736,456		8.1
Other pasture.....	3,273,764		35.8
Timber not pastured.....	123,452		1.4
All other land in farms.....	758,535		8.3
Other Private Land ⁵		4,985,156	100.0
Taxable forest lands.....	1,236,566		24.8
Other land.....	3,748,590		75.2
Use Undetermined (includes "Other Federal Land").....		5,114,559	
Total.....		53,346,560	

¹ Based on estimates of the Idaho School of Forestry.

² Copeland Report (See footnote for Table I).

³ Estimate of State Board of Land Commissioners, Idaho School of Forestry and Copeland Report.

⁴ Copeland Report 1930 census of Irrigation.

⁵ Census of 1930 corrected for publically owned farm land.

⁶ Report of State Treasurer, 1930-32.

LOCATION AND USE OF AGRICULTURAL LAND

The farming area of Idaho with few exceptions is located in those sections represented by the unshaded portion of Figure 1. Use of this area varies considerably with different types of farming and in the several portions of the state. Figure 2 shows the proportion of each election precinct devoted to farms, indicating that a very high percentage of the land area in some precincts is being farmed, while in others, farms utilize an insignificant amount of the area.

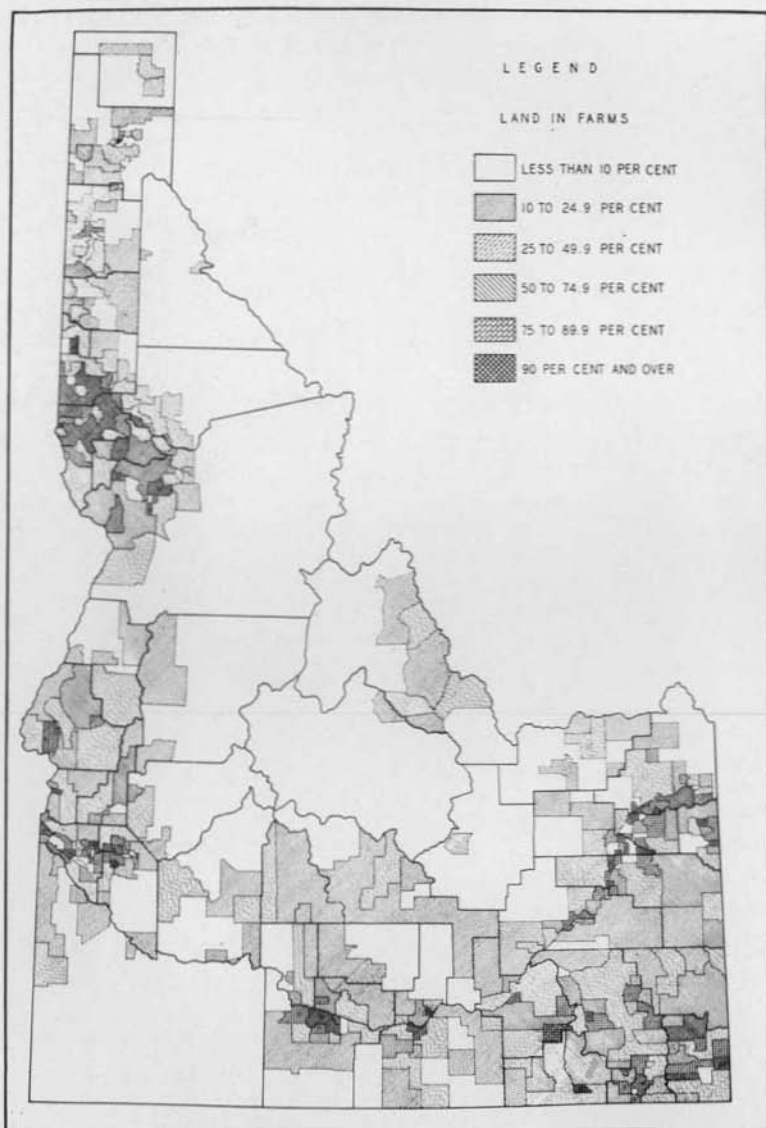


Fig. 2.—RELATIVE AMOUNT OF LAND AREA IN FARMS. The several types of shading indicate the per cent of the land area in each election precinct in farms in 1930. Boundaries of those precincts having less than 10 per cent of the area are not shown.

Proportion of Area in Irrigated and Non-Irrigated Farms.

The farming area as shown in Figure 2 is divided into irrigated and non-irrigated land in approximately the following proportions:

Irrigated Farms:	(acres)	(acres)
Area actually irrigated	2,181,250	
Non-irrigated area on irrigated farms	2,670,190	
Total Land in Irrigated Farms		4,851,440
Non-Irrigated Farms		
Crop land	1,892,015	
Other land	2,603,453	
Total Land in Non-Irrigated Farms		4,495,468
Total land in farms		9,346,908

The geographical location of the farming area is shown in Figure 3. As noted above, over half the land classed as irrigated farms is not irrigated. This is explained by the fact that irrigated farms classified by the census are of two types:¹ First, those farms which depend entirely upon irrigation for production of crops and pasture; and second, those which are so situated that irrigated and non-irrigated farming is practiced on the same farm. Of the total area in irrigated farms, 3,298,648 acres are included in the first and 1,552,592 acres comprise the second group of farms. Data allowing the segregation of the proportion of farm land irrigated are not available for each class of irrigated farms but generally only a small percentage of the land on partially irrigated farms is actually irrigated.

Distribution of Farms. In 1930 there were 41,674 farms in Idaho distributed throughout the agricultural area as indicated in Figure 4. Of these farms 27,953 or 67 per cent were irrigated. The irrigated farms consisted of 24,631 wholly irrigated farms and 3,322 classed as partially irrigated. Comparison of Figures 2 and 4 reveals that although several of the areas have relatively few farms, the per cent of the land area utilized by these farms is high. This situation exists particularly in parts of Latah, Nez Perce, and Lewis counties of northern Idaho and in Bannock and Bear Lake counties of southern Idaho.

Between 1920 and 1930 the total number of all farms decreased slightly over 1 per cent. Non-irrigated farms decreased 19 per cent but the number of irrigated farms increased nearly 11 per cent over the period. Canyon county had the largest increase in number of irrigated farms with 661 more farms in 1930 than in 1920, while Jerome with 309 and Bingham with 266 more farms represent other significant increases. Butte with a decrease of 114 and Lincoln with 100 less farms had the largest decrease in number of irrigated farms over the period. The number of non-irrigated farms declined in all

¹ The census classifies a farm as "irrigated" if any part of it is under irrigation.

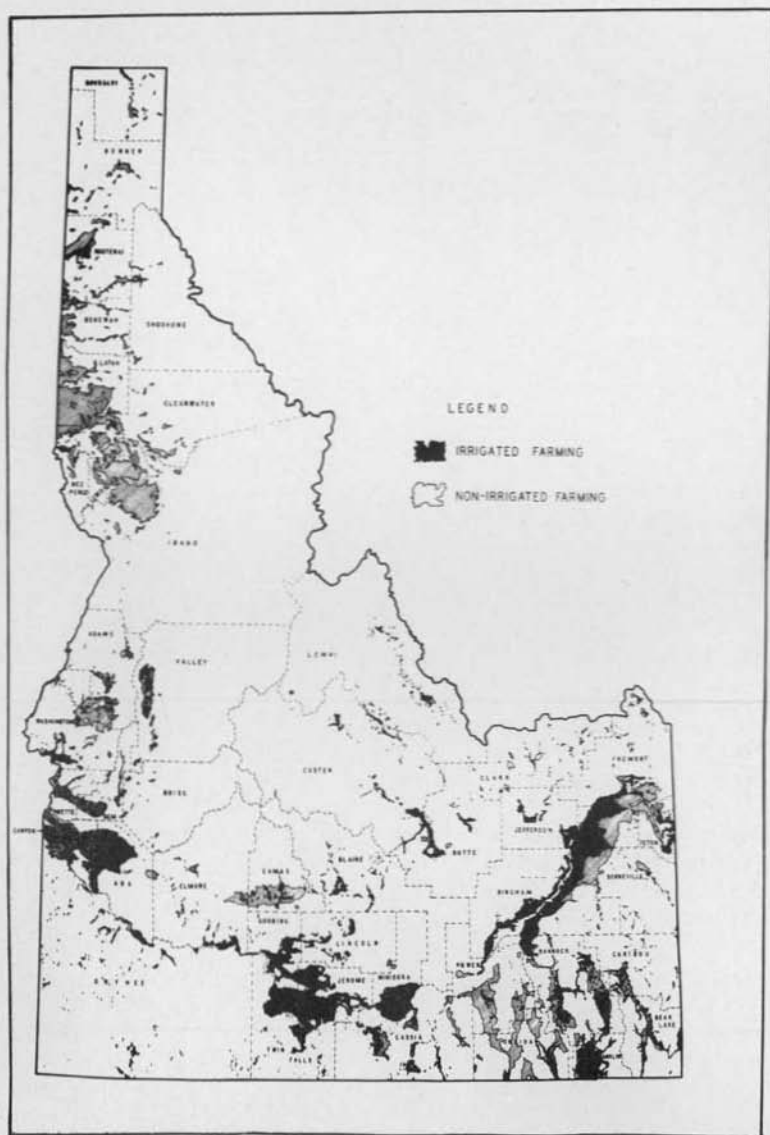


Fig. 3.—LOCATION OF IRRIGATED AND NON-IRRIGATED FARM LAND. Total area in farms equals 17 per cent of the land area of Idaho. Of this farm area, 52 per cent represents irrigated and 48 per cent non-irrigated farms. Many small isolated farming areas, particularly in the cut-over region of northern Idaho, could not be included on this map.

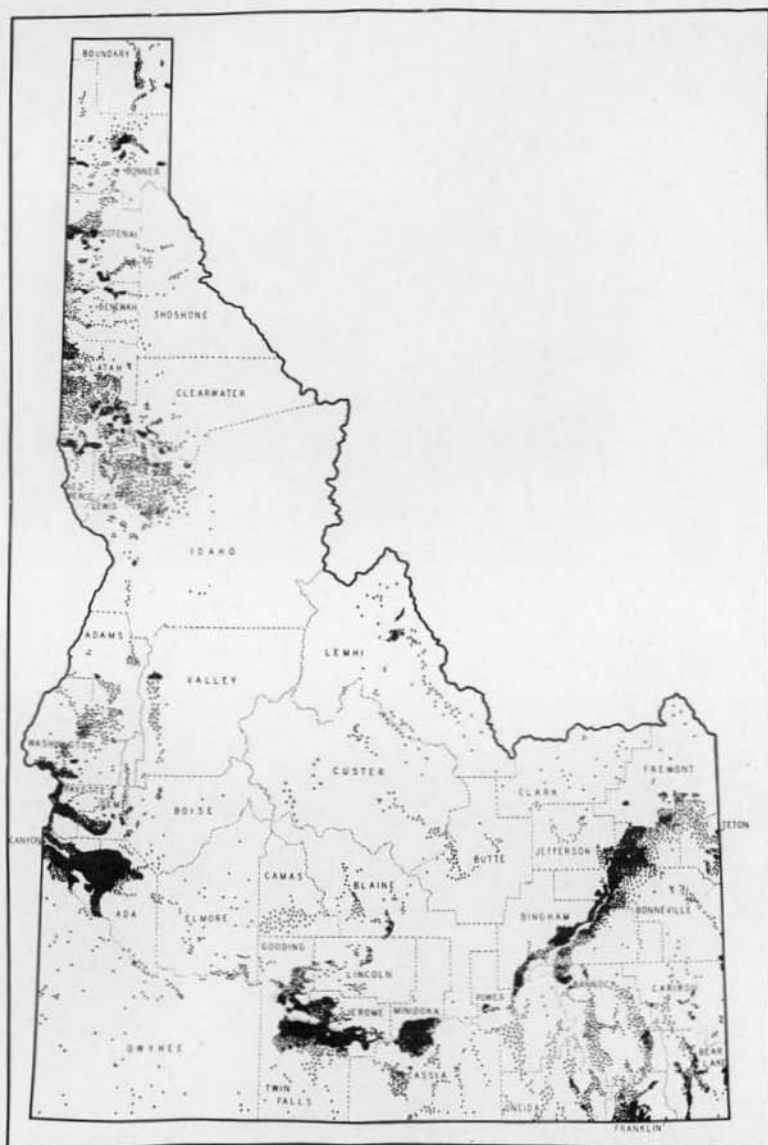


Fig. 4.—NUMBER AND APPROXIMATE LOCATION OF FARMS IN 1930. Canyon county leads the state in number of farms with 3,279, while Clark county comes last with only 124 farms. Each dot represents five farms.

but 7 counties between 1920 and 1930, Idaho county with 307 less farms representing the greatest decrease. Power, Clark, and Oneida counties also report decreases of over 200 non-irrigated farms in each county. Franklin county with 58 and Boundary with 53 more non-irrigated farms report the only significant increases in this type of farm.

Size of Farms. All irrigated farms in 1930 averaged 174 acres and all non-irrigated farms averaged 329 acres per farm. Nearly 80 per cent of the irrigated farms are less than 175 acres, with 60 per cent less than 100 and 34 per cent less than 50 acres in size. Non-irrigated farms are considerably larger with only 51 per cent under 175 acres, 28 per cent under 100 acres, and 18 per cent less than 50 acres. Over 32 per cent of non-irrigated farms range between 175 and 500 acres in size. Figures on the average size of farms may be

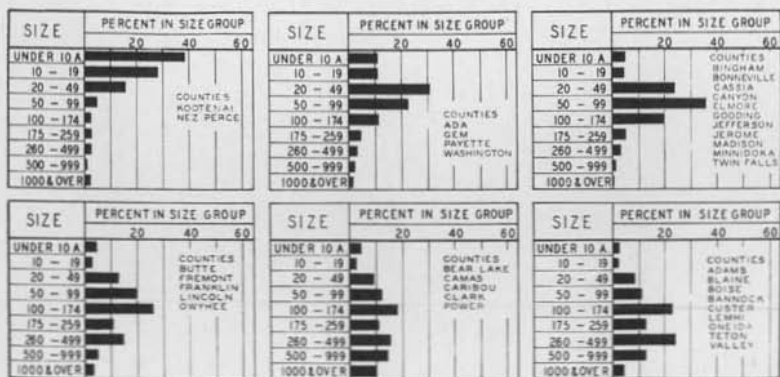


Fig. 5.—VARIATION IN SIZE OF IRRIGATED FARMS IN 1930.

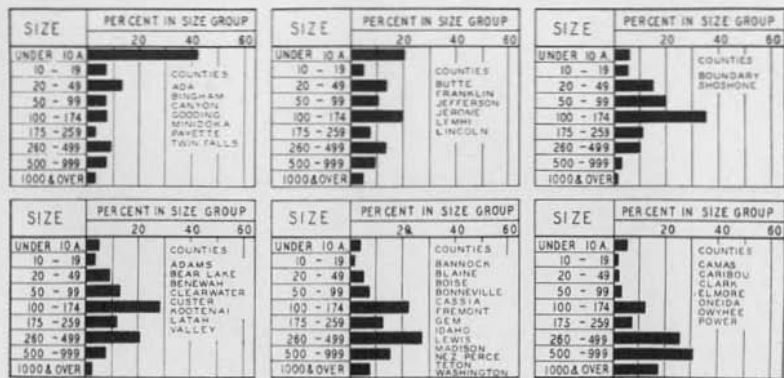


Fig. 6.—VARIATION IN SIZE OF NON-IRRIGATED FARMS IN 1930.

misleading due to existing differences in the character of farms in various parts of the state. The average-sized farm may not be the typical sized farm in a county because the farms may be of such a nature that a large percentage of them are very small and at the same time there may be a considerable number of extremely large farms in the county, making the average size an unrepresentative measure of the size of farms. Figure 5 is presented to show the proportion of irrigated farms which fall within the different sized groups. Similar data for non-irrigated farms are presented in Figure 6. In these diagrams the counties which reported approximately the same type of distribution were grouped together in one diagram; thus each diagram representing a group of counties can be interpreted as being representative of any county included in the group.

Figure 7 shows the average size of farms on an election precinct basis. The election precinct represents the smallest unit for which census data are available. Because of these small units, it is believed that the average size of farms on this basis is representative of the area to which it applies. It should also be noted that the data in this figure, as well as others which follow, are related to the actual farming area, as determined from Figure 3. This practice was adopted because of the large amount of land in each county which is not farmed.

The size of irrigated farms is highly correlative with the proportions of the farm irrigated. Irrigated farms in Ada and Canyon counties average 70 acres in size with an average of 84 and 90 per cent of the irrigated farms actually irrigated. At the other extreme, irrigated farms in Idaho county average 1,515 acres with an average of only 2 per cent of the farm irrigated. By classifying and grouping the irrigated counties on the basis of the size of their irrigated farms, it was found that in those counties where the irrigated farms averaged less than 100 acres per farm, 83 per cent of the land in irrigated farms was irrigated, leaving only 17 per cent non-irrigated land on these irrigated farms. The following table contains these percentages for various sized groups,¹ and the results for each county can be determined from Figure 8.

Size of Irrigated Farms (acres)	Number of Counties	Per Cent of Land Irrigated Per Irrigated Farm
under 100	5	83
100 to 150	6	77
150 to 200	6	53
200 to 250	3	45
250 to 300	5	42
300 and over	13	22

¹ If a scatter diagram is constructed, the line of average relationship between these factors drops sharply until farms reach 200 acres in size. It then gradually levels off as larger sized farms are included. Data for individual counties cluster rather closely around this line, and when grouped on the basis of their magnitude and the direction of their deviation, indicate that the predominant type of farming in the area is a significant factor explaining why all counties having a given average sized farm do not always have the same proportion of irrigated land per irrigated farm.

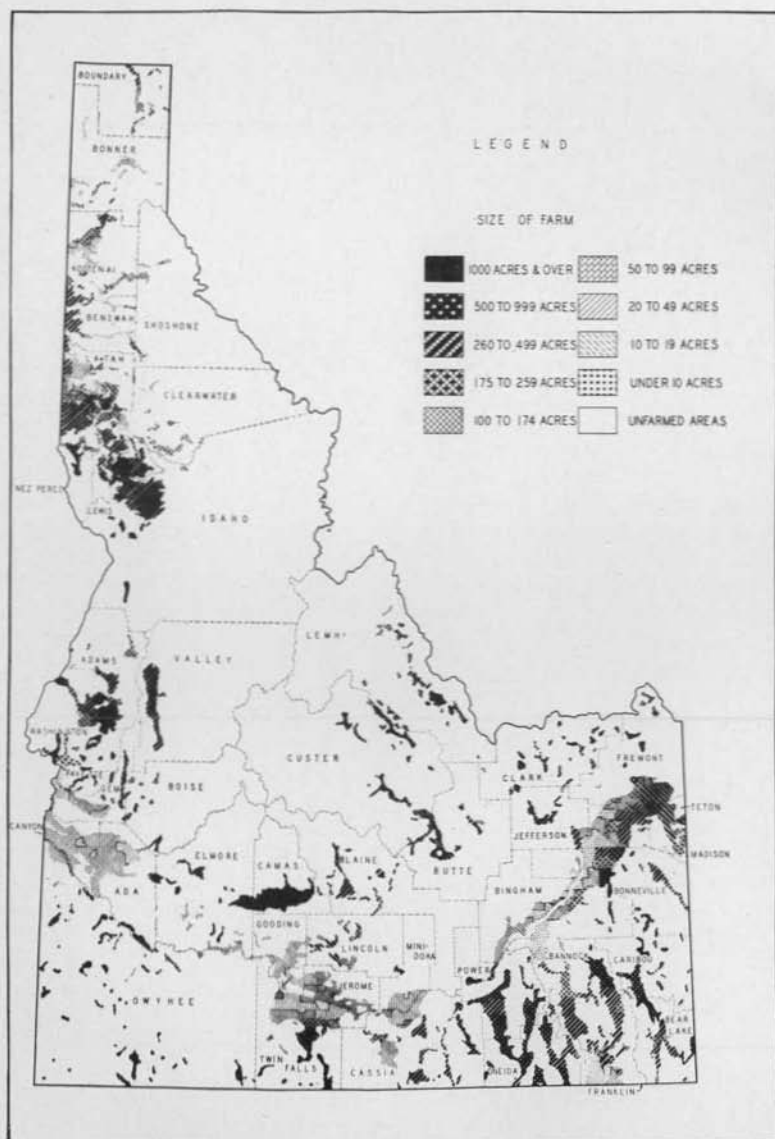


Fig. 7.—AVERAGE SIZE OF FARMS BY PRECINCTS. The average size of all farms was 224 acres in 1930. A few large livestock and animal-specialty farms greatly influence this average, for three-fourths of the farms are less than the average size. Twenty-one per cent range between 100 and 175 acres, while 50 per cent of the farms are under 100 acres in size.

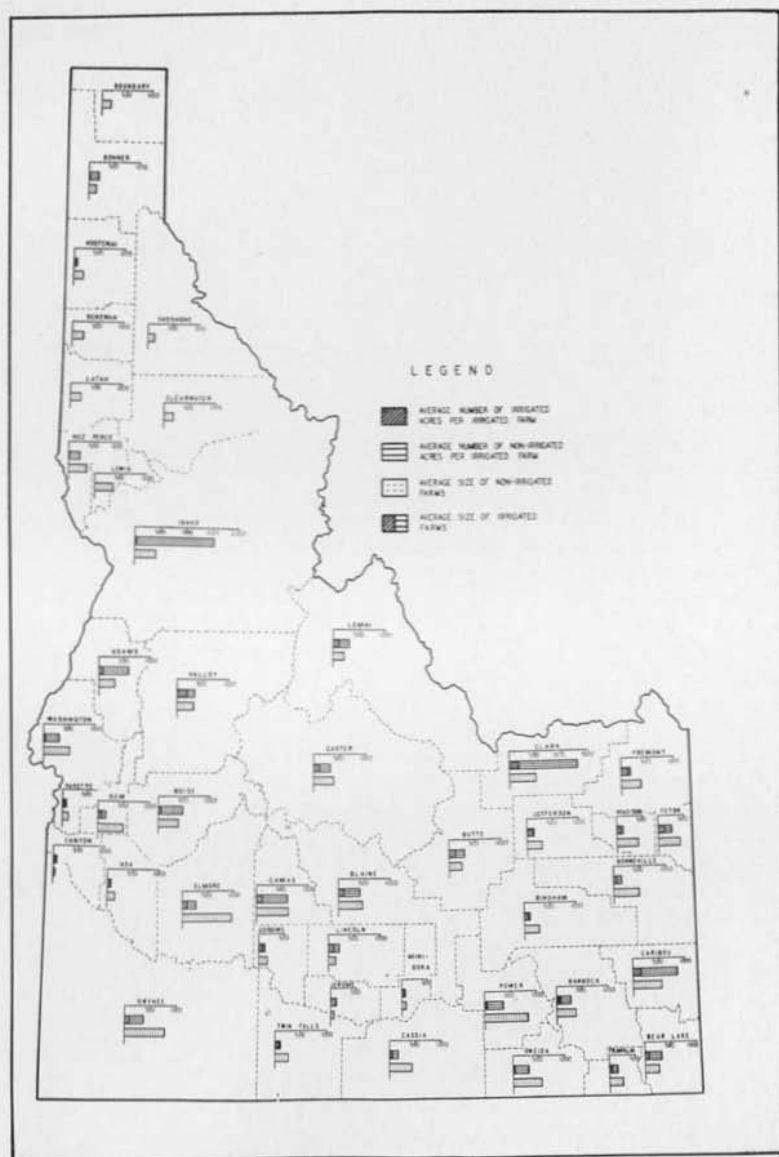


Fig. 8.—AVERAGE SIZE OF IRRIGATED AND NON-IRRIGATED FARMS AND NUMBER OF IRRIGATED ACRES PER FARM IN 1930. Irrigated farms average 174 acres, wholly irrigated farms average 134, and partially irrigated farms average 467 acres in size. Non-irrigated farms average 328 acres.

The proportion of crop land to the total area in the farm also varies with the size of irrigated farms. The relative amount of crop land increases gradually until farms reach approximately 100 acres in size, when it declines as farms become larger. Explanation of this relationship is based largely upon the fact that the proportion of crop land to the total farm area is in turn related to the type of farming, and the typical sized farm increases from the intensive farming areas to those which use the land more extensively. Further consideration of the size of farms associated with the various types of farming is deferred to the second Bulletin of this series.

Changes in Size of Farms. The average size of all farms decreased 11 acres per farm between 1900 and 1910, increased 27 acres between 1910 and 1920, and increased 25 acres more between 1920 and 1930. During this last decade the average size of farms increased in 28 counties, decreased in 9, and remained approximately the same in 7 counties. As shown by differences in the proportion of all farms falling in different sized groups, there was not a uniform change in the size of large farms and small farms over the period. Nearly 23 per cent of all farms in 1920 were less than 50 acres while 28 per cent of all farms in 1930 fell in this sized group. 1930 shows no change over 1920 in the proportion of farms ranging between 50 and 100 acres, a 4 per cent decrease in all farms between 100 and 175 acres and a 1 per cent decrease in the proportion of farms over 175 acres in size. Comparing these percentages with Figure 9 it is found that although farms ranging between 100 and 175 acres decreased 4 per cent in numbers, these farms utilized only 3 per cent less area than they did in 1920.

Although the average size of farms has increased since 1920, individual types of both irrigated and non-irrigated farms increased in some areas and declined in others. Incomplete census data for 1920 makes it impossible to determine changes in the size of individual groups of irrigated and non-irrigated farms. Data from other sources, however, lead to the conclusion that generally, with exceptions in a few more recently settled areas, the size of non-irrigated farms has increased materially since 1920. Irrigated farms have not shown this marked tendency to move in the same direction. Scattered irrigated farms in the higher valleys have tended to increase in size while in the fruit and vegetable producing areas the size of irrigated farms has decreased. In other irrigated areas there have existed two distinct tendencies to change the size of farms. During the period from 1917 to 1921 the size of many irrigated farms increased materially, but with unfavorable prices following 1921 there was a marked splitting-up of farms into smaller sized units. This trend, however, continued for only a few years and was followed by a gradual increase in size of irrigated farms which has continued up to the present time.

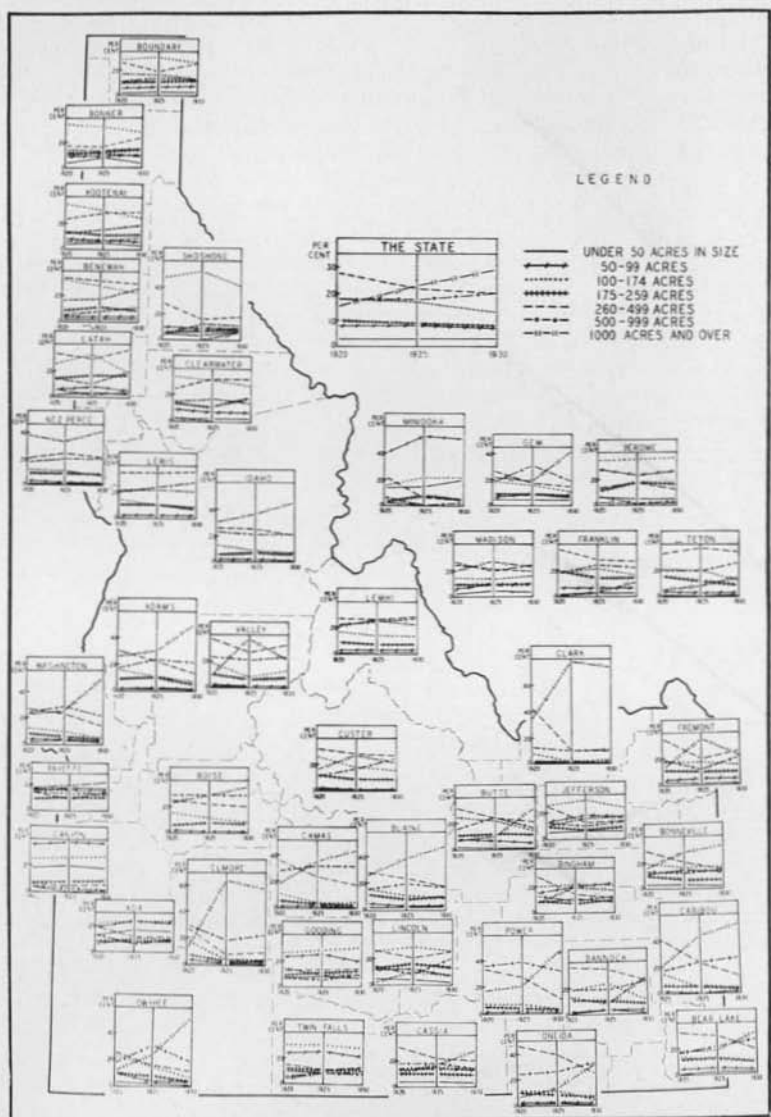


Fig. 9.—CHANGES IN THE PER CENT OF THE FARM AREA UTILIZED BY FARMS OF VARIOUS SIZES IN 1920, 1925, AND 1930. Over 29 per cent of the farm area in 1930 was in farms over 1,000 acres in size, while only 10 per cent of the area was used by farms under 100 acres in size.

Figure 9 shows the per cent of the farm area utilized by farms of various sizes in 1920, 1925, and 1930.¹ Farms under 50 acres are grouped together in the first class because it was found that these farms did not take up over 3 per cent of the area of any county.

Cultivated and tillable area. The 9¼ million acres of land in farms in 1929 consisted of 4,073,265 acres in cultivated land, 4,391,801 acres in pasture, 123,452 acres of woodland not used for agricultural purposes, and 758,390 acres classified as "other land." Nearly 43 per cent of the area in irrigated farms was cultivated, the remainder being largely non-irrigated pasture. Only 6 per cent of the irrigated area on irrigated farms was in pasture in 1929. About 48 per cent of the cultivated land in the state in 1929 was on non-irrigated farms.

Figures 10, 11, and 12 indicate the existence of considerable variation among farming areas in methods of utilizing the land in farms. Comparison of the proportion of farm land cultivated and the per cent of the farm area tillable² brings out the significant fact that in some irrigated regions the proportion of farm land tillable is much larger than that cultivated, thus indicating that in these areas a considerable amount of the irrigated land used for pasture is of such nature that it could easily be converted into crop land if water were available. Little difference exists between the per cent of the farm area tillable and the per cent cultivated in the non-irrigated sections of northern Idaho, because only a small proportion of farms have an appreciable area of plowable pasture.

The number of acres cultivated per farm generally varies directly with the size of farm. Since 1919 the cultivated area has increased on non-irrigated farms and decreased in the irrigated areas (See Fig. 12). These changes are also closely associated with changes in the size of farms, although some of the shifts in irrigated farms are explained partly by changes in the cropping and livestock systems. Shortage of water has, in some instances, led to a reduction in the area cultivated in order to better utilize the existing supply.

Differences noted in the percentage of tillable and cultivated area per farm are associated with the amount of pasture land and the type of pasture on farms. The major pasture types found in the agricultural areas are presented in Figure 13. The areas on this map are shaded in accordance with the importance of the given type of pasture in the area. The group of heavy shadings, termed "predominant" pasture types, represent those areas in which most of the pasture is of one type, with other types of pasture relatively insignificant. The other group represented by lighter shadings refer to areas in which one type of pasture prevails but in which other types are also important.

The cropping system. As previously shown, 4,073,765 acres were devoted to crops in 1930. Wheat represents the most important crop of the state in terms of acreage, comprising a large portion of

¹ Changes in boundary lines of many counties does not permit comparison with previous census periods.

² Tillable area includes cultivated area plus plowable pasture.

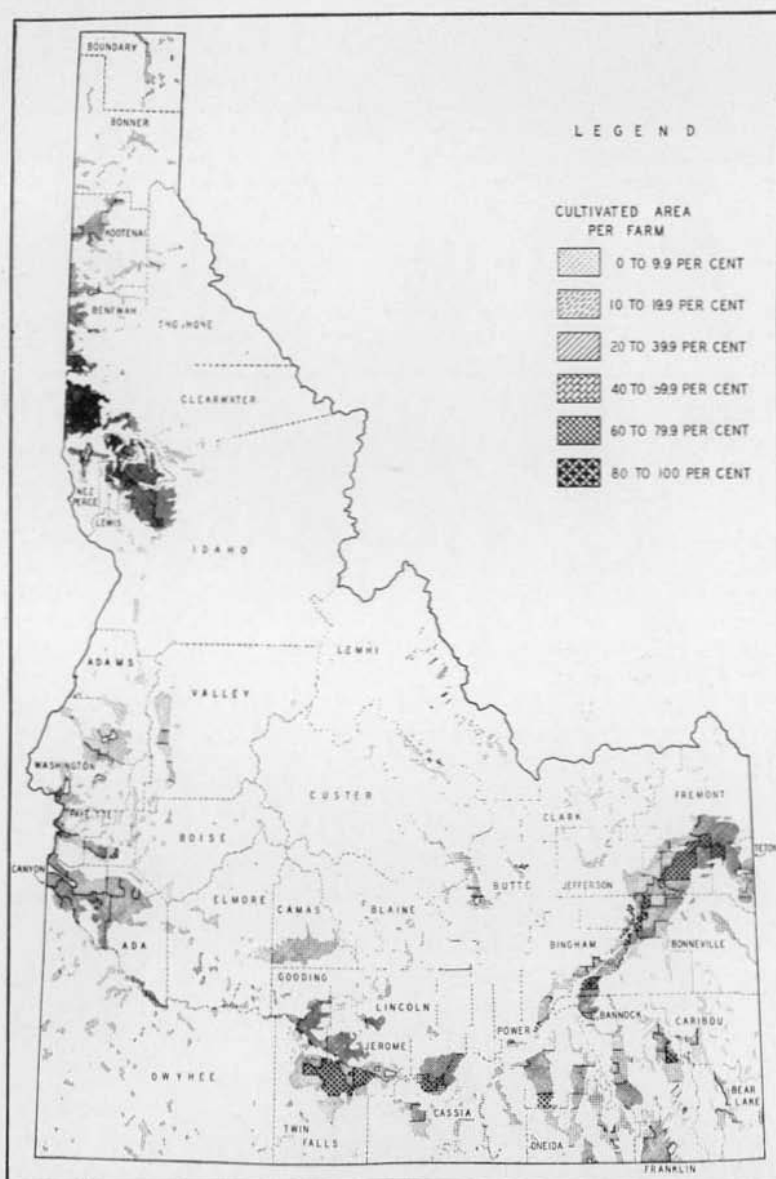


Fig. 10.—PERCENTAGE OF FARM LAND CULTIVATED IN 1929. Cultivated land represents harvested crop land, fallow land, and land on which crops failed in 1929. The ratios of cultivated area to total farm area vary from 91 per cent in one precinct of Latah county to less than 2 per cent in parts of Clark and Idaho counties.

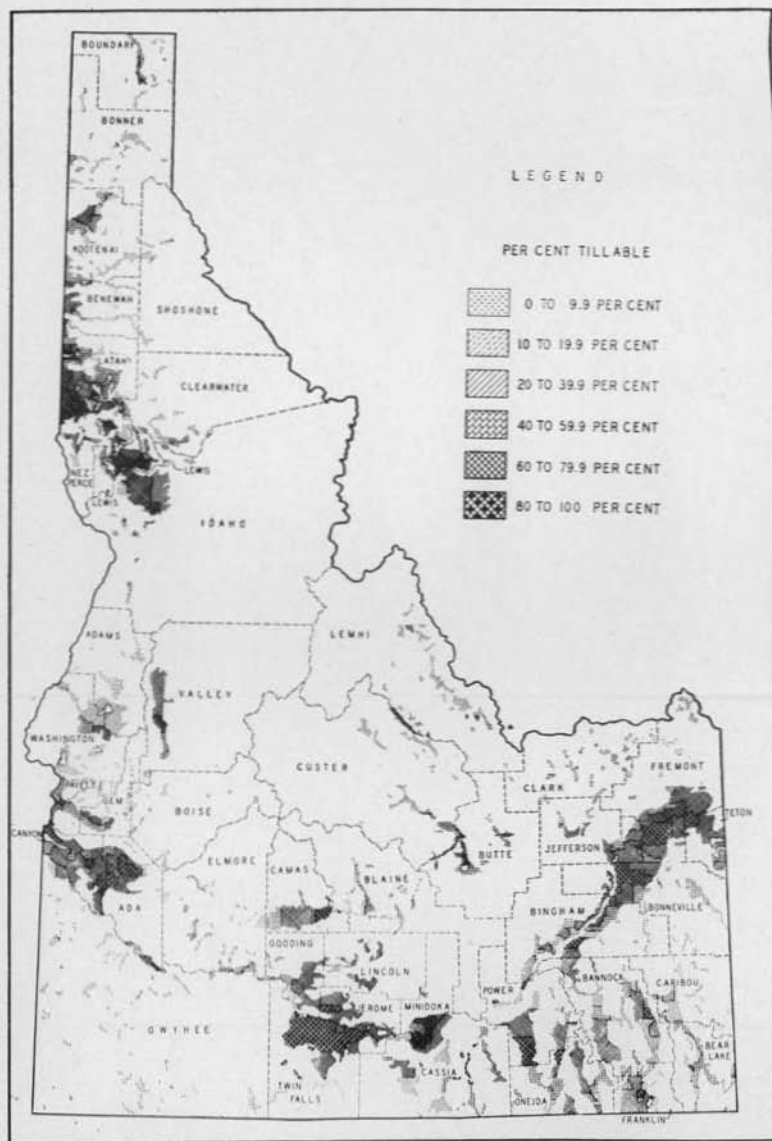


Fig. 11.—PERCENTAGE OF FARM LAND TILLABLE IN 1929. Only 47 per cent of the land area in farms was classed as tillable land, consisting of crop land and plowable pasture. Clark and Owyhee counties had the smallest proportion of farm land tillable.

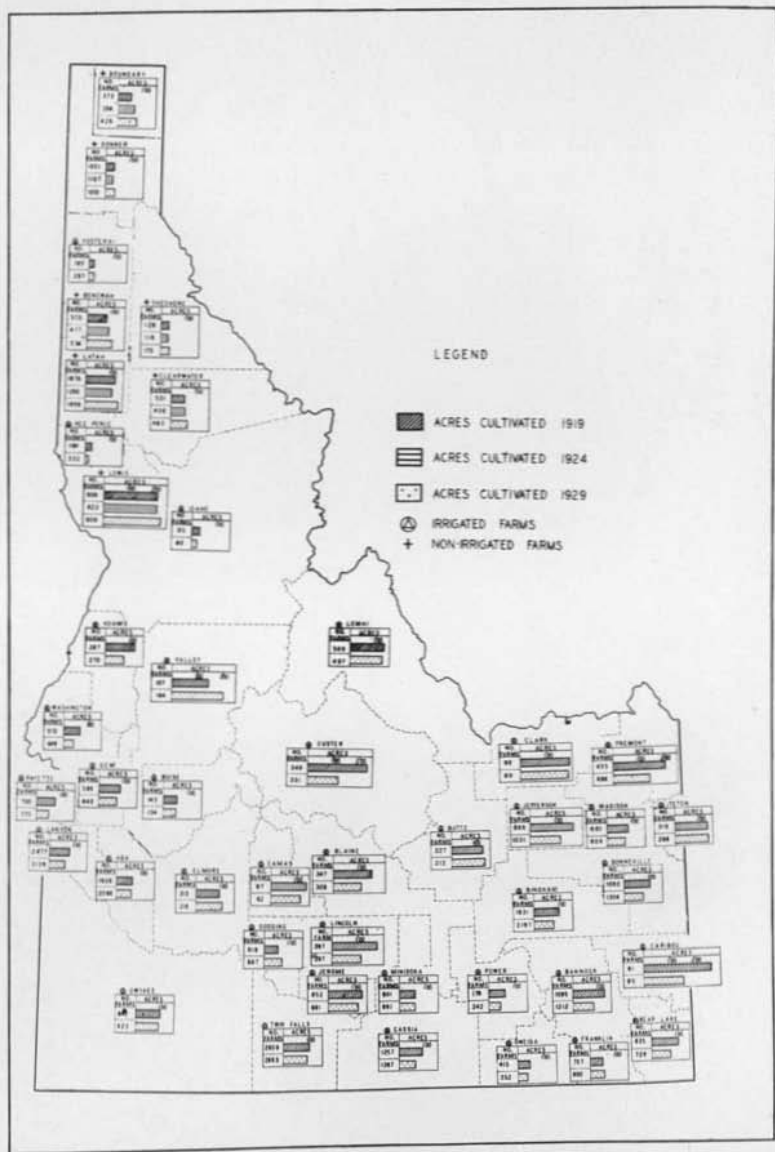


Fig. 12.—CHANGES IN CULTIVATED AREA PER FARM, 1919-1929. These data represent either irrigated or non-irrigated farms, as indicated by the symbols before each county name. The figures in connection with each bar represent the number of farms, either irrigated or non-irrigated, in that county.

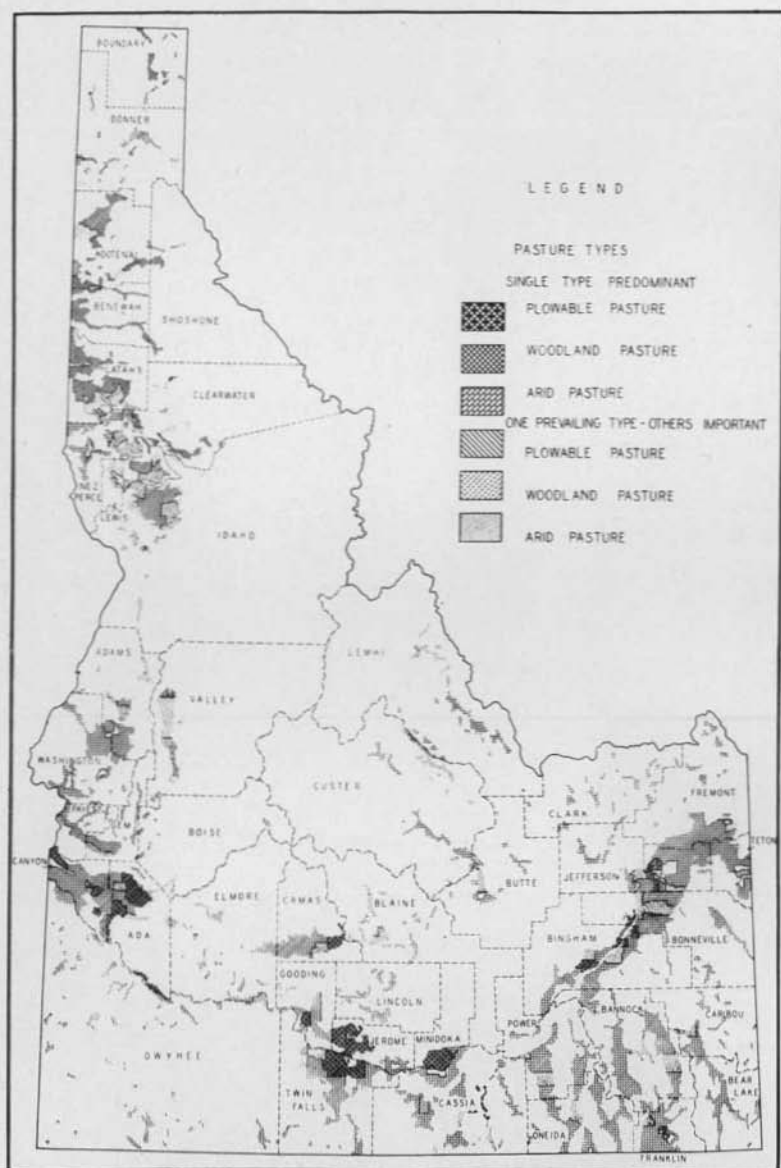


Fig. 13.—PREDOMINANT TYPES OF PASTURE ON FARMS IN 1929. Pasture areas are grouped into two general classes to indicate the relative importance of the predominant type of pasture in the area. Areas designated as having a "Single Type Predominant" are those in which only one kind of pasture is important. "Prevailing" type areas indicate that several kinds are important.

the cropped area of non-irrigated farms. On irrigated farms alfalfa or some other hay crop utilizes much of the crop area. The proportion of the crop area of the state and of irrigated and non-irrigated farms devoted to the main crops is contained in Table III. As shown in this table, 32 per cent of all crop land was in wheat in 1929. Of the total irrigated crop land 13 per cent was in wheat, while of the total non-irrigated crop area 53 per cent was devoted to wheat production. Of the total area in wheat, 22 per cent was irrigated.

TABLE III
Proportion of the Crop Area in Major Crops, 1929

Crop	Per Cent of Total Crop Area in each Crop	Per Cent of Irrigated Crop Area in each Crop	Per Cent of Non-irrigated Crop Area in each Crop	Proportion of Each Crop Area Irrigated
Wheat.....	31.8	13.0	53.4	22
Alfalfa.....	18.8	28.9	7.2	82
Timothy and clover..	4.5	5.3	3.6	63
All other hay.....	4.9	4.0	5.9	44
Sugar beets.....	1.2	2.2	...	100
Potatoes.....	1.9	3.1	.5	89
Oats.....	3.3	2.6	4.2	42
Barley.....	3.3	3.2	3.4	52
Grass seeds.....	2.3	3.7	.6	87
Orchards.....	.9	.8	1.0	48

Figure 14 shows the relative importance of the main crops on irrigated farms in each county. Figure 20, among other things indicates the relative importance of crops on all farms in each county. Study of these maps reveals that in Caribou, Blaine, Boise, Custer, Adams, and Lemhi counties, over 70 per cent of the irrigated crop area was in hay in 1929. In several counties, particularly Valley and Adams, timothy and clover represent important hay crops. Beans predominate in Twin Falls county and are significant crops in Jerome, Cassia, and Minidoka counties, in southern Idaho, and along with peas are important in several non-irrigated counties of northern Idaho. Corn, although a relatively unimportant crop in the state, is grown primarily in Canyon, Ada, Gem, Payette, Washington, and Gooding counties.

Distribution of crops. The geographical distribution of significant crops based upon the acreage devoted to each, is presented in Figures 15 to 19. Because the acreage devoted to the growing of a crop is but one factor in determining the relative importance of the crop in the area, selected yield data are presented in the table accompanying each map. Irrigated and non-irrigated farms are considered as a separate group in each table. The percentage of the total crop acreage of a given crop located on irrigated farms is given in

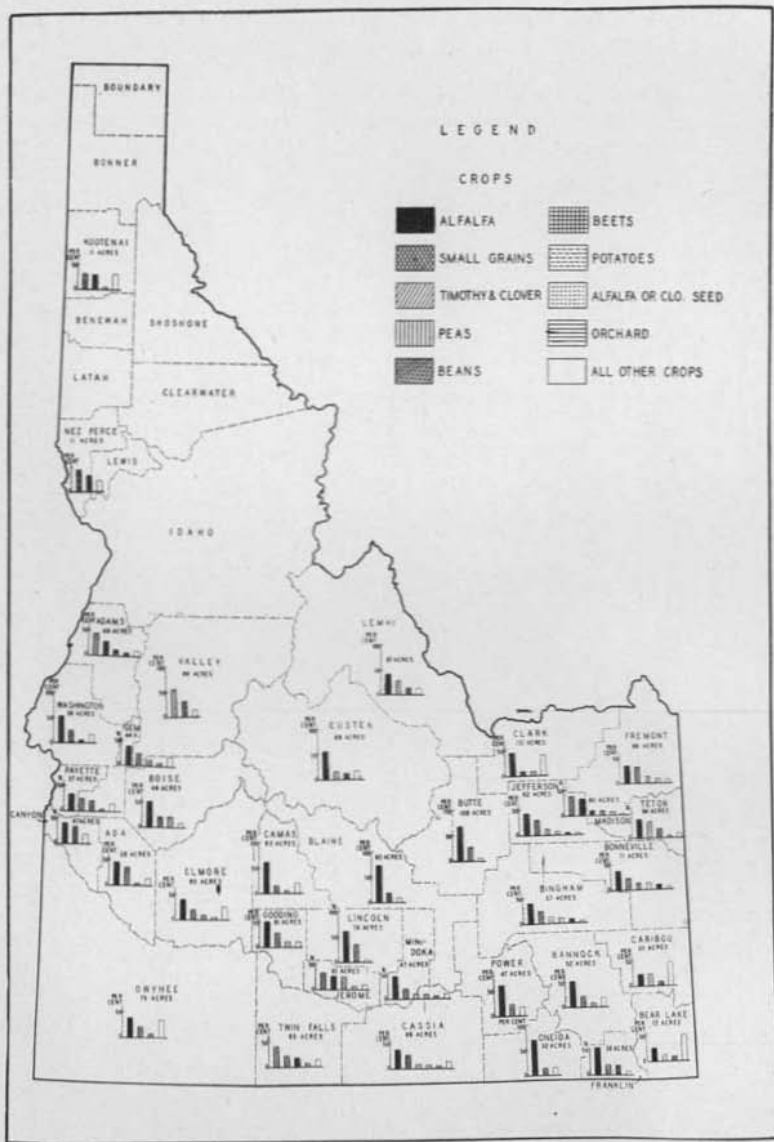


Fig. 14.—RELATIVE IMPORTANCE OF IRRIGATED CROPS BY COUNTIES IN 1929. The length of the bars indicates the per cent of the cropped area on irrigated farms devoted to various crops. The figures included under the county name represent the average area irrigated per irrigated farm.

the second column. The Index of Crop Yields (Column 3) is the ratio of the county yield on irrigated farms to the average yield on all irrigated land in 1929. Columns 4 and 5 are interpreted the same as Columns 2 and 3 except that they refer only to non-irrigated farm land. For example, 93 per cent of the wheat acreage in Ada county was on irrigated and 7 per cent was on non-irrigated land. The average yield of wheat on irrigated land in the county was 104 per cent of the average yield of wheat on all irrigated land in the state. Interpreted another way, the yield of wheat on irrigated farm land was 4 per cent above the average yield on all irrigated land in 1929. The yield of wheat on non-irrigated farms in Ada county was 5 per cent below the average yield on non-irrigated farms in 1929. The table for each crop is interpreted the same way.

Reports of the County Agents and Extension Specialists indicate that crop yields in the main irrigated sections were generally normal for most crops in 1929, except for Blaine, Lincoln, and Gooding counties, which reported an extreme shortage of irrigation water. Farms in the mountain valleys which are dependent upon direct stream flow for their irrigation water also were seriously affected by water shortages in 1929.

Early frosts reduced potato yields approximately 10 per cent in Cassia, 20 per cent in Bonneville, 5 per cent in Minidoka, and 20 per cent in Jefferson counties. Beet yields were but slightly reduced by the frosts.

Precipitation in 1929 was about 25 per cent below normal in most parts of the state. Yields on non-irrigated farms in southern Idaho were generally reduced, the south-central portion being most affected. Non-irrigated crops in northern Idaho were near average except in the three northern counties where precipitation ranged from 25 to 50 per cent below normal. Bonner county reported all yields below average. Kootenai and Benewah reported nearly average wheat yields but greatly reduced hay yields. Minor crops such as beans and peas were practically a failure in all parts of northern Idaho.

As shown in Figure 20 the acreage of each important field crop increased between 1919 and 1929. Alfalfa increased in all counties except those situated in the south-central portion of the state. Decreases of alfalfa and wheat in this area are associated with significant increases in row crops, particularly beans, potatoes, and sugar beets. In several northern counties alfalfa has only recently been introduced into the cropping system. Wheat acreage has generally declined on the main irrigated tracts but has increased materially in the non-irrigated farming areas. The bean acreage of Twin Falls county has increased to the point where it was the largest of any crop in 1929. Other significant shifts in crop acreage are revealed in the diagram (Fig. 20).

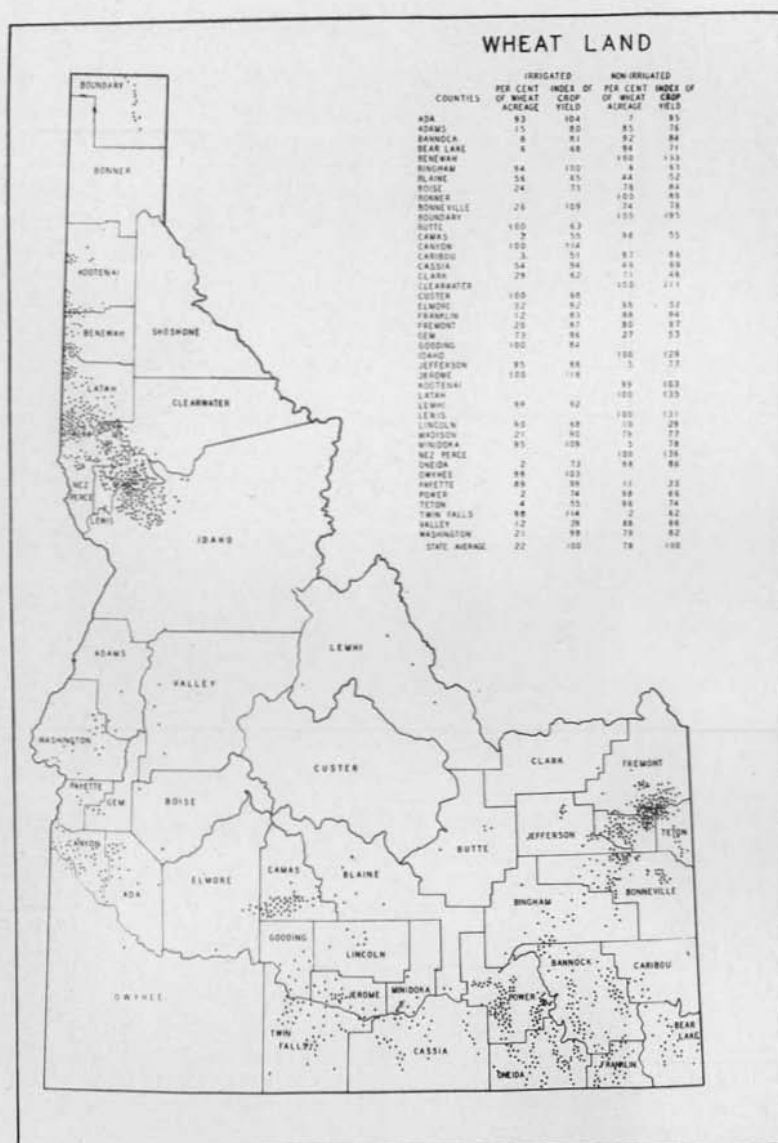


Fig. 15.—GEOGRAPHICAL DISTRIBUTION OF WHEAT LAND IN 1929. (Each dot represents 1,000 acres). The accompanying table indicates the division of all wheat land between that irrigated and that non-irrigated. Relative yields for each county are based on the state average yield as normal for that year.

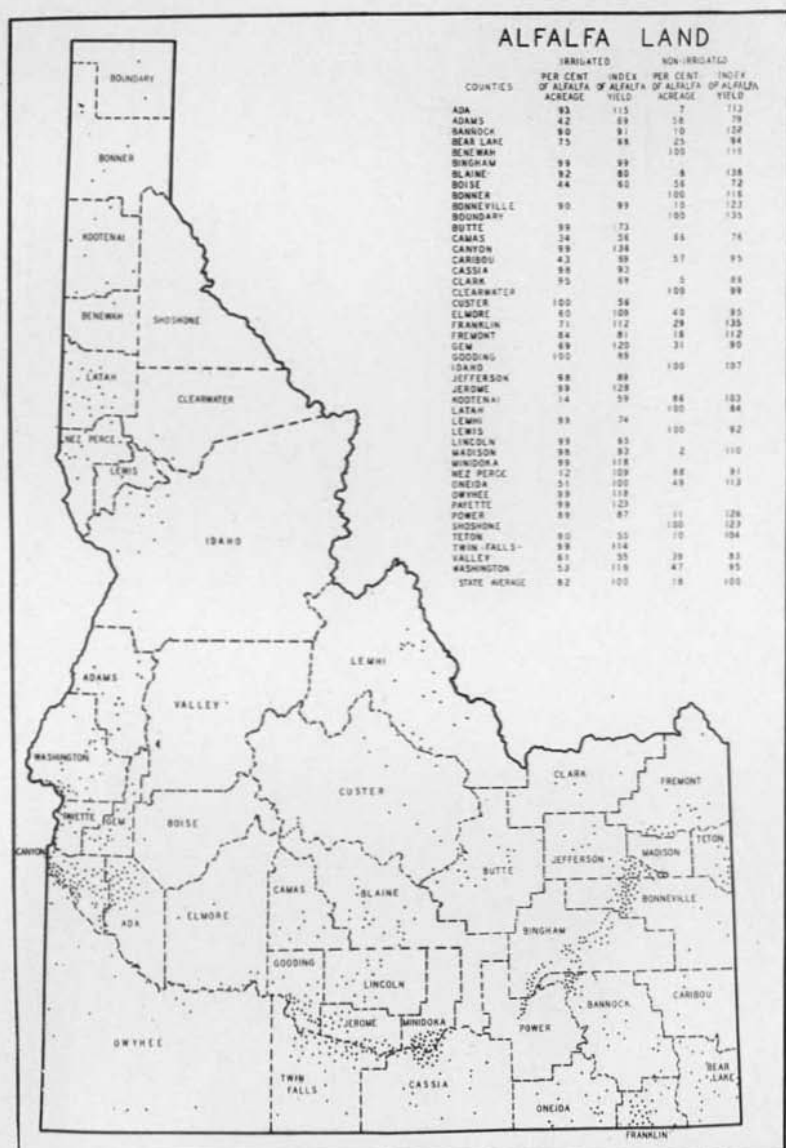


Fig. 16.—GEOGRAPHICAL DISTRIBUTION OF LAND IN ALFALFA HAY IN 1929. (Each dot represents 1,000 acres). Alfalfa represents an important crop on irrigated farms, 82 per cent of all Alfalfa being on irrigated land.

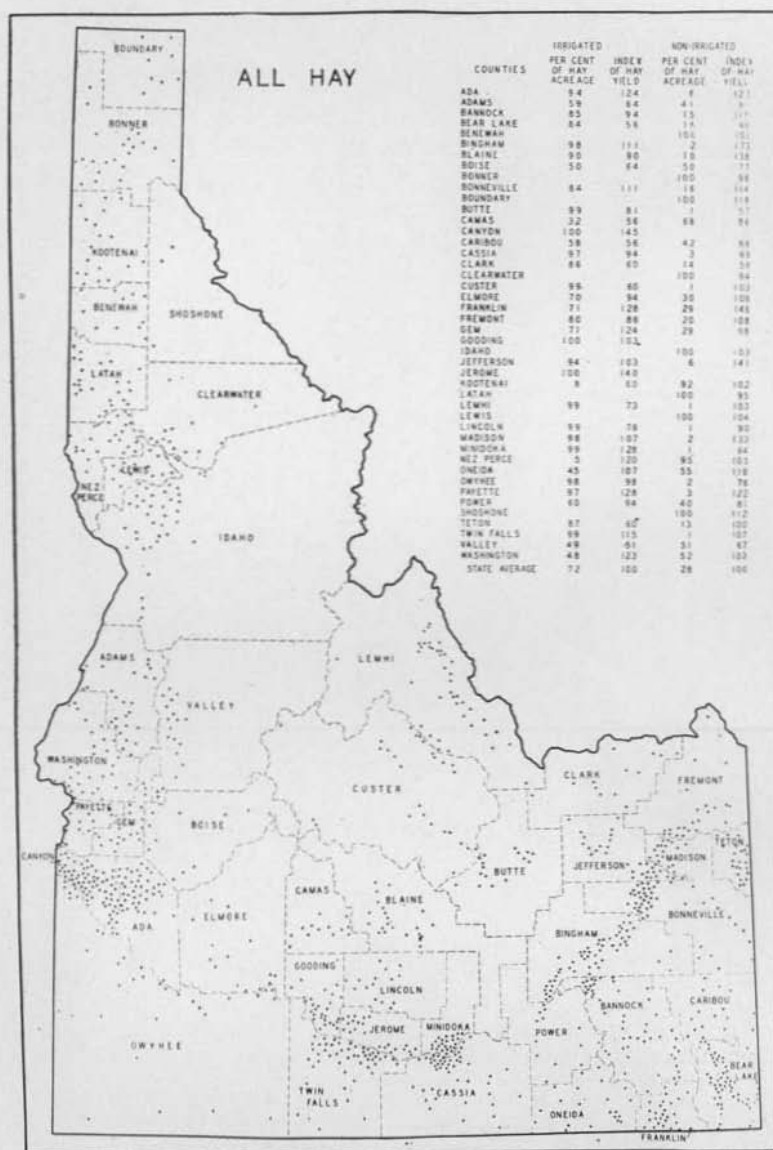


Fig. 17.—GEOGRAPHICAL DISTRIBUTION OF HAY LAND IN 1929. (Each dot represents 1,000 acres). While 82 per cent of all alfalfa was grown under irrigation, only 72 per cent of all hay land was irrigated. Although alfalfa is the most important type of hay, considerable amounts of other types are grown in non-irrigated areas.

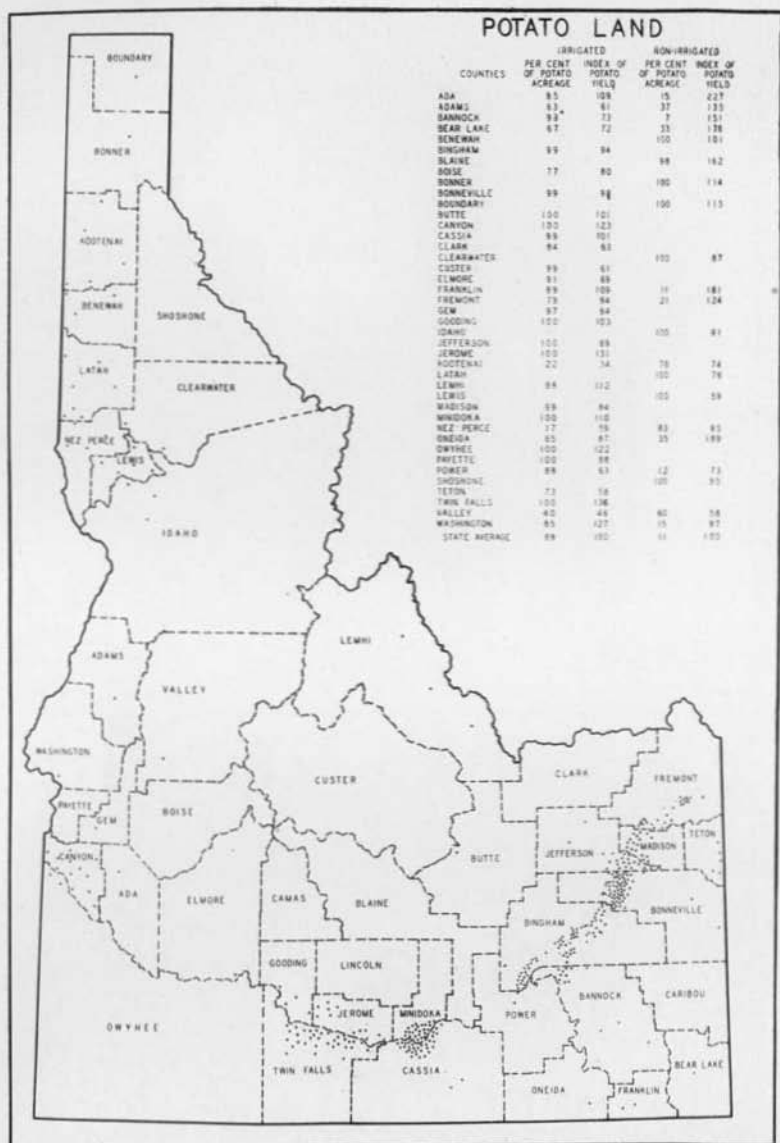


Fig. 18.—GEOGRAPHICAL DISTRIBUTION OF POTATO LAND IN 1929. (Each dot represents 200 acres). A very large proportion of potatoes are grown on irrigated lands in the Upper and Lower Snake River Valley.

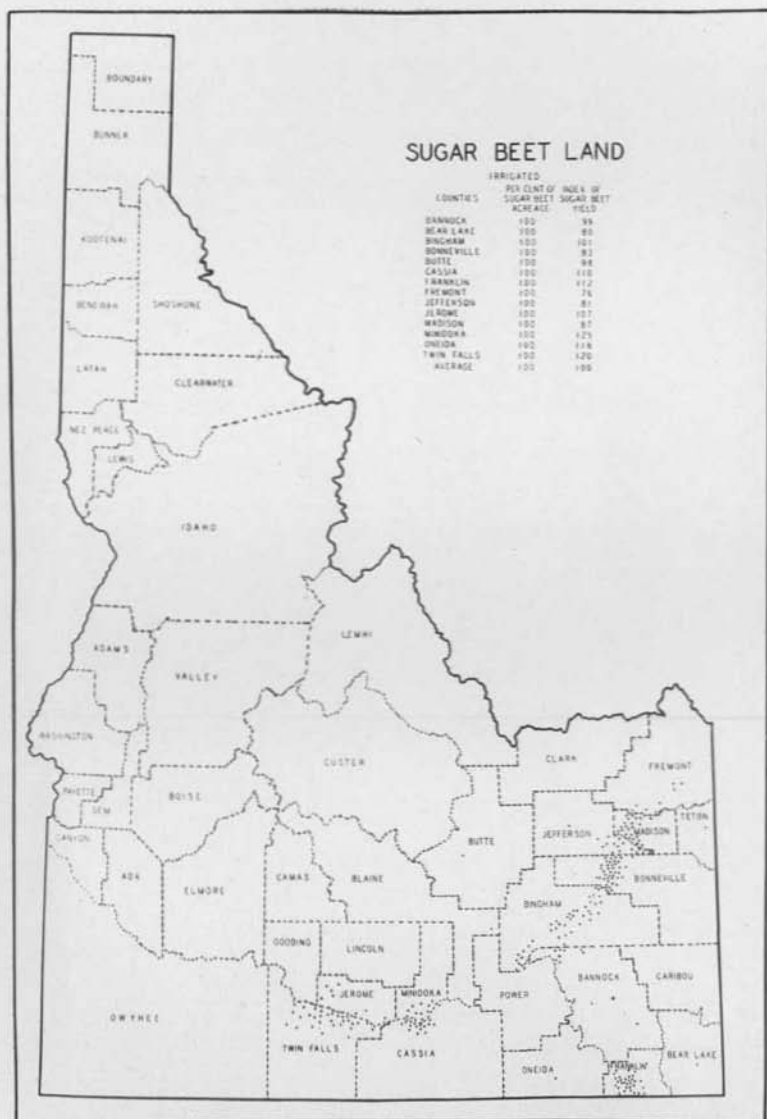


Fig. 19.—GEOGRAPHICAL DISTRIBUTION OF SUGAR BEETS IN 1929. (Each dot represents 200 acres). The sugar beet and potato producing areas are closely associated except for Franklin county which is a more important sugar beet growing area.

The total area devoted to fruit production is small compared with other crops. However, from the standpoint of value of crop produced, fruits are of considerable importance in several areas. In 1930 there were 1,285 fruit farms in the state, 25 per cent of which were located in Payette county. Ada, Canyon, Twin Falls, Gem, and Nez Perce counties represent other significant producing areas. Apples, prunes, peaches, and cherries, in the order named, are the main fruits produced. Since 1919 fruit production has increased considerably. These changes are indicated in Figure 21, showing the acreage devoted to each important type of fruit in 1919 and 1929.

The acreage devoted to vegetables in each important producing county, changes in acreage between 1919 and 1929, and the crops responsible for the acreage change are listed in Table IV.

TABLE IV

Changes from 1919 to 1929 in Acreage of Vegetables Harvested for Sale in Important Producing Counties in Idaho

County	Acres Harvested		Amount of Change (acres)	Crops Responsible for change listed in order of Importance ¹
	1919	1929		
Ada	255	438	183	Beets (85), Dry Onions (47), Celery (23), Green Peas (21)
Bannock ..	48	256	208	Green Peas (55), Celery (27), Dry Onions (26), Sweet Corn (24)
Bingham ..	54	119	65	Dry Onions (15), Green Beans (15)
Canyon ...	125	1825	1700	Sweet Corn (739), Dry Onions (403), Lettuce (182), Green Peas (86), Celery (61), String Beans (46), Watermelons (34)
Franklin ..	19	551	532	Green Peas (508)
Gem	363	297	-66	Watermelons (-123)
Gooding ..	17	230	213	Carrots (91), Dry Onions (56), Watermelons (36)
Kootenai ..	130	225	95	String Beans (42), Sweet Corn (20)
Latah	67	155	88	Watermelons (25), Tomatoes (19), String Beans (13)
Madison ..	8	104	96	Green Peas (86)
Nez Perce	178	492	314	Watermelons (65), Sweet Corn (51), Lettuce (48), Cantaloupes (47), Spinach (27), Cabbage (20), Tomatoes (-86)
Payette ...	39	486	447	Sweet Corn (390), Green Peas (32)
Teton	170	170	Green Peas (168)
Twin Falls	106	531	425	Dry Onions (214), Beets (76), Watermelons (36)
Valley	1	132	131	Green Peas (96)

¹ Figures in parentheses are acres of change attributable to the specified crop.

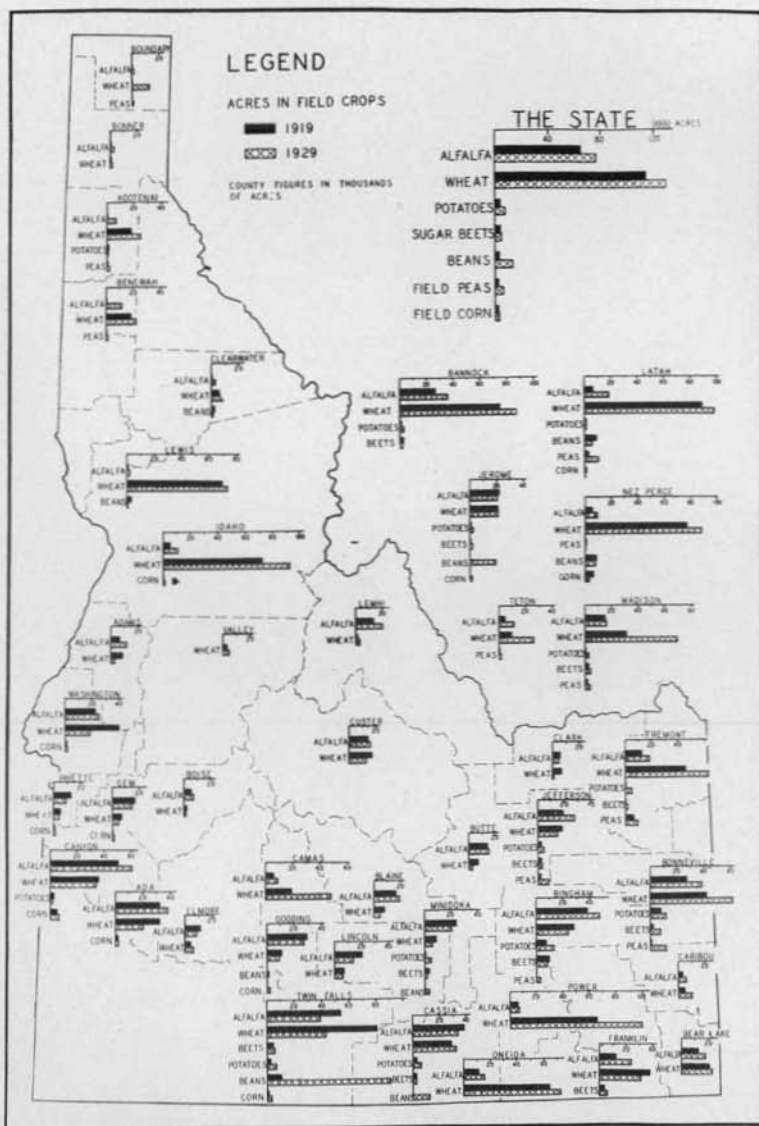


Fig. 20.—CHANGES IN ACREAGE OF MAJOR FIELD CROPS BETWEEN 1919 AND 1929 BY COUNTIES. The total acreage of every field crop included increased over this period, with significant shifts in the types of crops grown in several counties.

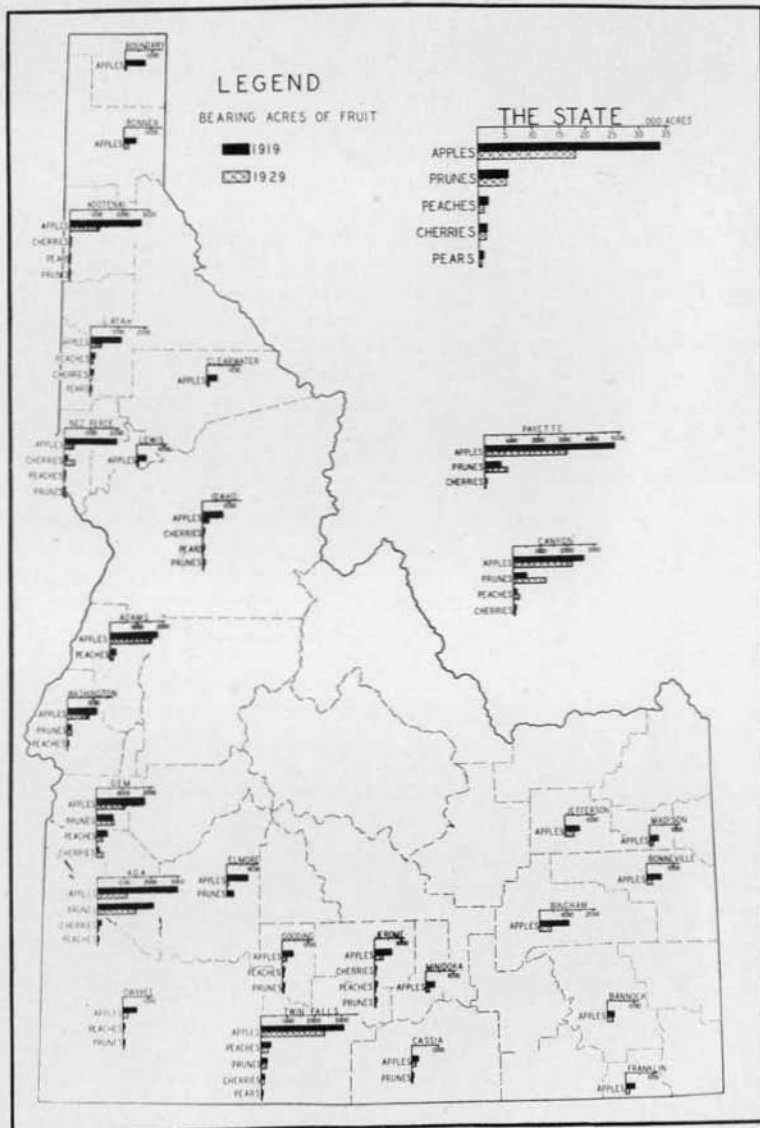


Fig. 21.—ESTIMATED NUMBER OF ACRES DEVOTED TO GROWING VARIOUS TYPES OF FRUIT IN 1919 AND 1929. Only trees of bearing age representing 88 per cent of all fruit trees in 1929 are included. Canyon, Gem, and Payette counties have the largest proportion of non-bearing trees.

Livestock Enterprises. Livestock production represents an important phase of agriculture in Idaho, both from the standpoint of the added income derived from the industry and the utilization of feed crops produced in the state. The Division of Crop and Livestock Estimates report approximately 2,396,000 sheep and lambs, 528,000 beef cattle, 277,000 swine, and 208,000 dairy cattle on farms January 1, 1934. These livestock are mostly distributed in varying proportions throughout the southern part of the state. Although some of the livestock on farms in a given county on January 1 are moved into adjoining counties during the feeding seasons, Figure 22 indicates the approximate contribution of each county to the total number of each class of livestock. Producers in the main producing counties do not usually confine their activities to the production of a single type of livestock. For example, Owyhee is an important cattle and sheep producing county. Canyon exceeds all others in numbers of dairy cattle and hogs, while other counties, particularly Twin Falls, Cassia, Bingham, and Bonneville, are important producers of all types of livestock.

Resources in the producing areas have led to the development of both the range industry and farm livestock enterprises. Production on the farms varies from that in which livestock represents the major enterprise with the whole farm organization built around it, to the other extreme in which crop production predominates with livestock carried as a sideline. Likewise, these farms differ with respect to the production of the feed produced for the livestock enterprise. Most farms in the irrigated regions produce all the feed required. In the range areas, however, only enough feed is usually produced to carry the stock through the winter months, dependence being placed upon the public domain, national forests and state and private lands for the remainder of that consumed.

The geographical distribution and approximate location of the major classes of livestock are presented in Figure 23.

Swine production is conducted mainly as a sideline on about 13,000 farms in the state. Canyon, Bingham, Bonneville, and Bannock counties reported the greatest number of farms producing swine. The average number of head per farm on those reporting swine in 1930 varied from 35 in Idaho county to 5 in Bear Lake county. All farms in the state reporting swine averaged 20 head per farm.

Dairy cattle are found in nearly every farming area, but the dairy farms are mainly located in a few irrigated regions of the state. Over 76 per cent of all farms reported dairy cows in 1930, but only 14 per cent of these are classed as dairy farms. Twenty-five per cent of all dairy cows were on dairy farms with 44 per cent of the whole milk and 27 per cent of the butterfat sold coming from this type of farm. Nearly 25 per cent of all dairy cattle are found in

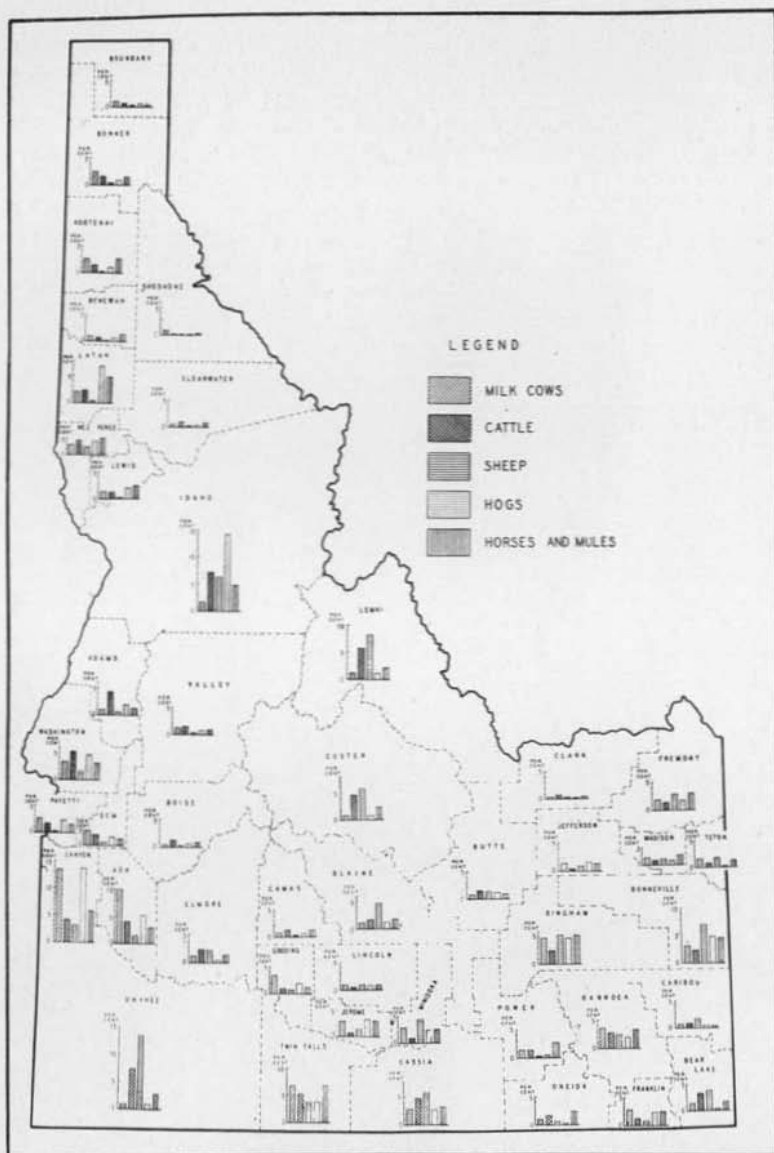


Fig. 22.—THE PROPORTION OF VARIOUS TYPES OF LIVESTOCK ON FARMS IN EACH COUNTY ON JANUARY 1, 1932. The length of each bar represents the percent of all livestock of that type in the state found in the given county. For example, 14 per cent of all Idaho sheep were on farms in Owyhee county on January 1, 1932.

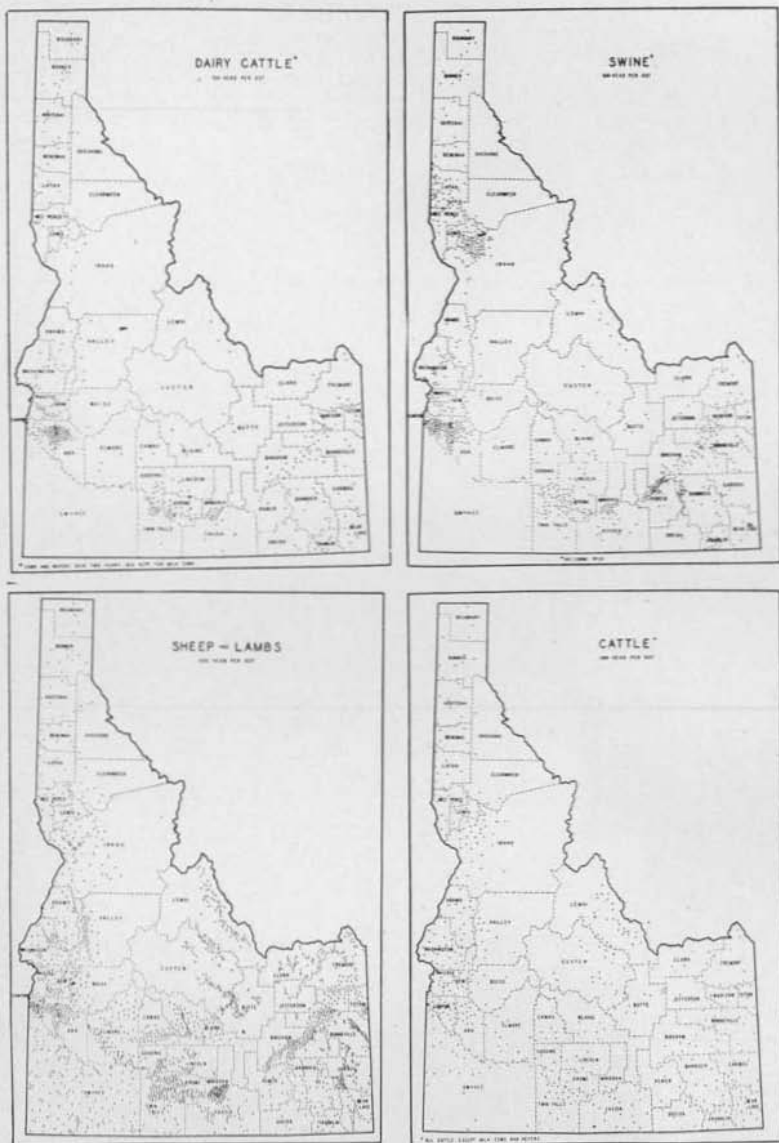


Fig. 23.—DISTRIBUTION AND APPROXIMATE GEOGRAPHICAL LOCATION OF LIVESTOCK ON FARMS JANUARY 1, 1933. Note that the dots do not represent the same number of head in each map.

Canyon and Ada counties. A few dairy farms are located in northern Idaho, but the bulk of the dairy cattle in this area are found on other types of farms, particularly cash-grain, self-sufficing, and part-time farms.

The beef cattle industry in Idaho includes both range and feeding enterprises. Each enterprise is usually separately conducted under very different conditions. Cattle ranches are generally located in the high mountain valleys at a considerable distance from railroads or good highways. Hay and small grains produced for feed represent the main crop on the small irrigated portion of each ranch. As a rule the ranches are operated in conjunction with the surrounding range, the spring ranges adjoining the ranch and the summer range in the forest reserves and higher mountains providing most of the feed during the grazing season. The producing units are usually small, averaging around 100 head per ranch. Some ranches have as few as 25 head of cattle, the limiting factor being the amount of winter feed which can be grown. These small producers have organized grazing associations in some areas. The cattle run together under the management of the association, with costs pooled on the basis of the number of animals grazed. The majority of the cattle leave the range as two-year-olds, about 50 per cent moving to market as grass-fat cattle and 50 per cent moving into feed lots.

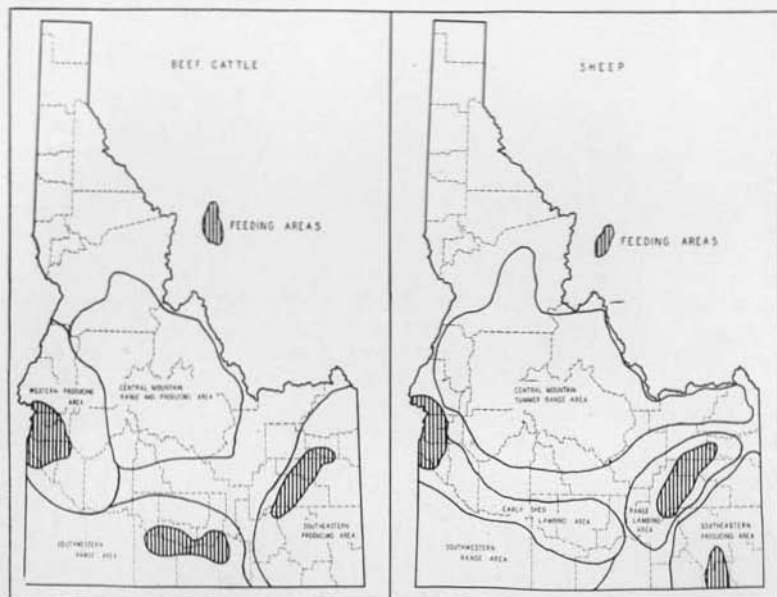


Fig. 24.—GENERAL GRAZING AND FEEDING AREAS FOR BEEF CATTLE AND SHEEP.

Cattle feeding enterprises represent an important phase of the farm business on a number of irrigated farms during the fall and winter months. Normally between 35,000 and 50,000 head of cattle are marketed each year after being fattened on fall pastures and winter feed lots. The important winter feed lot areas are found in the southwestern and south-central sections of the state, while the central-mountain and southeastern areas are important in the production of grass-fat cattle.

Figure 24 indicates the general grazing and feeding areas for cattle and sheep. The importance of the national forests as a source of summer range is indicated by the fact that for the 13-year period ending with 1932, producers have grazed an average of 140,026 cattle and 1,322,809 sheep yearly in the national forests. Approximately 95 per cent of the cattle and 94 per cent of the sheep grazed in national forests were grazed in Region IV, comprising the area south of the Salmon River. In recent years the Minidoka, Cache, and Lemhi national forests have been the important cattle grazing areas while a large proportion of the sheep are grazed in the Targhee, Caribou, and Sawtooth forests. The Nez Perce and Clearwater forests are the only significant forest grazing areas in northern Idaho.

Sheep production represents the major livestock industry of Idaho. In 1930, 22 per cent of the farms reported sheep and lambs with an average of 366 head per farm. The 820 sheep ranches in the state reported 64 per cent of the sheep on all types of farms, or an average of about 2,500 head per ranch. Farm flocks averaging between 50 and 90 head per farm have proven a valuable means of utilizing the surplus feeds and by-products such as beet tops, grain stubble, and bean and pea straw. The range sheep enterprise is carried on primarily for mutton-producing purposes, the lamb crop representing the greatest source of income. The range areas of Idaho, as indicated in Figure 24, consist of winter, spring, and summer grazing lands.

The central mountain range area because of its elevation and accessibility represents the most important summer range in the state. Although some sheep are wintered in the more remote portions of this area, most of the ewes and lambs grazed in the region come from the upper and lower Snake River Plains. The movement into this area begins in May, and the shipment of grass-fat lambs to market continues from June to mid-August.

The southeastern range is a combination of a high mountain summer range and fall feeding area. A considerable part of the area consists of forest reserves and Indian reservations ranging in altitude from 4,000 feet to 8,000 feet. Feeding is practiced on the larger irrigated farms and on some of the non-irrigated grain farms. Beet tops represent an important source of fall and winter feeds in several counties in the area.

The southwestern range area is significant for its winter and spring range. This area consists largely of desert, ranging in altitude from 3,000 to 4,000 feet. Carrying capacity of the range is light and of very little value during the summer and fall. The flocks wintered in this area move either eastward into the higher ranges and national forests or migrate into adjoining states. Very little feeding is practiced because of the small irrigated area on farms.

Both shed and range lambing is practiced in the state. Early shed lambing is practiced in the lower altitudes mostly along the Snake River Valley from Minidoka county to the Oregon state boundary. Range lambing is carried on in the upper Snake River Plains in Power, Bingham, Jefferson, and Madison counties. Generally shed lambing is practiced in areas where winter feed is cheap and the spring range must be used early to utilize the forage. Range lambing is usually practiced in the mountain areas of northern and eastern Idaho, although some sheepmen use both the range and the shed lambing systems.

The proportion of lambs marketed from feed lots and range vary from year to year. It is estimated that during the past five years an average of 74 per cent of the lambs were marketed from the range, 13 per cent from fall pasture, and 13 per cent from winter feed lots. Considerably more variation exists in the proportion of lambs coming from fall pastures and winter feed lots than those from the summer range which is more uniform each year.

The poultry enterprise represents a sideline on most Idaho farms. Of the 4 million fowls raised in 1929, 85 per cent were chickens, 13 per cent were turkeys, and 2 per cent were ducks and geese. Turkeys are important in a few counties in southwestern and south-central Idaho. Less than 2 per cent of all farms receive 40 per cent or more of their farm income from poultry or poultry products. However, 83 per cent of all farms in Idaho reported some poultry over three months of age. Slightly less than 58 per cent of all poultry flocks in Idaho had less than 50 hens per flock, 27 per cent had between 50 and 100 hens, 11 per cent had between 100 and 200, and 4 per cent had over 200 hens per flock. Franklin county with 20 per cent had by far the greatest proportion of flocks with over 200 hens per flock. Considering flocks having 200 or more hens per flock as a commercial flock, it is found that Canyon county had 222, Franklin county had 143, and Ada county had 132 commercial flocks of poultry. Other counties of the state had relatively few commercial flocks. Although Lincoln and Kootenai are relatively unimportant poultry producing counties, 43 per cent of all flocks in Lincoln and 22 per cent of all flocks in Kootenai county were of commercial size.

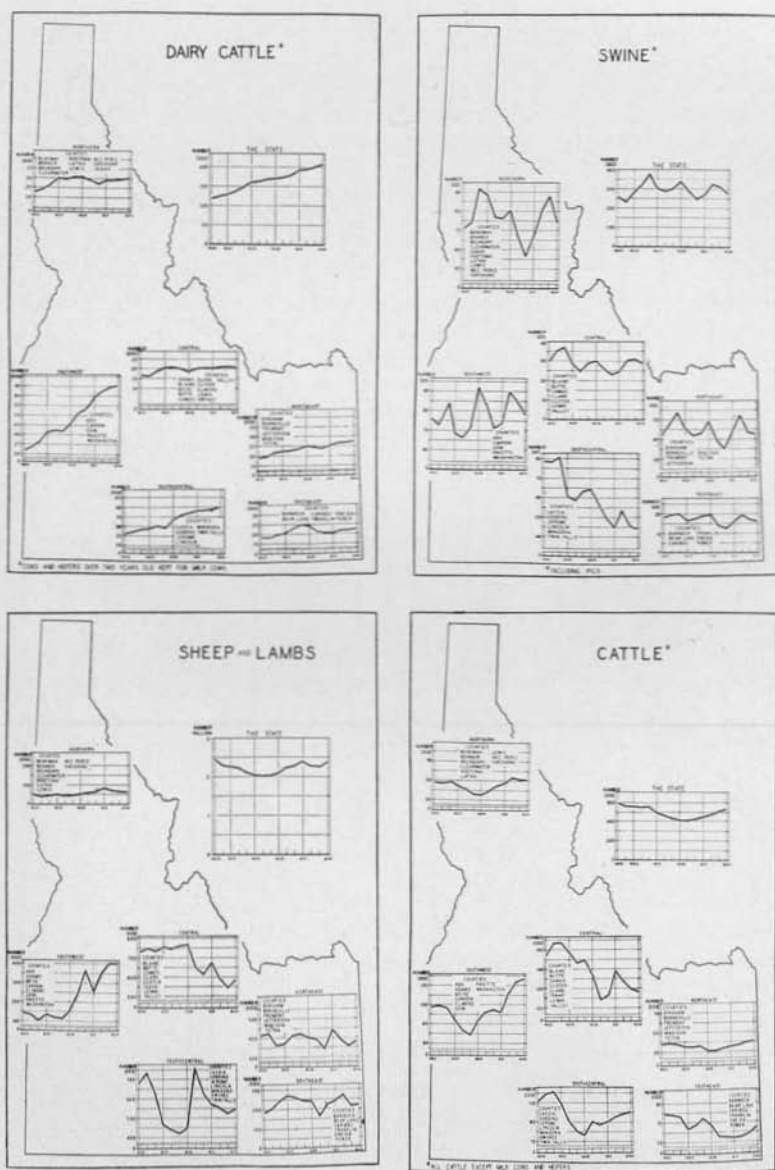


Fig. 25.—CHANGES IN NUMBER OF VARIOUS CLASSES OF LIVESTOCK ON FARMS JANUARY 1, 1922-1934 BY DISTRICTS.

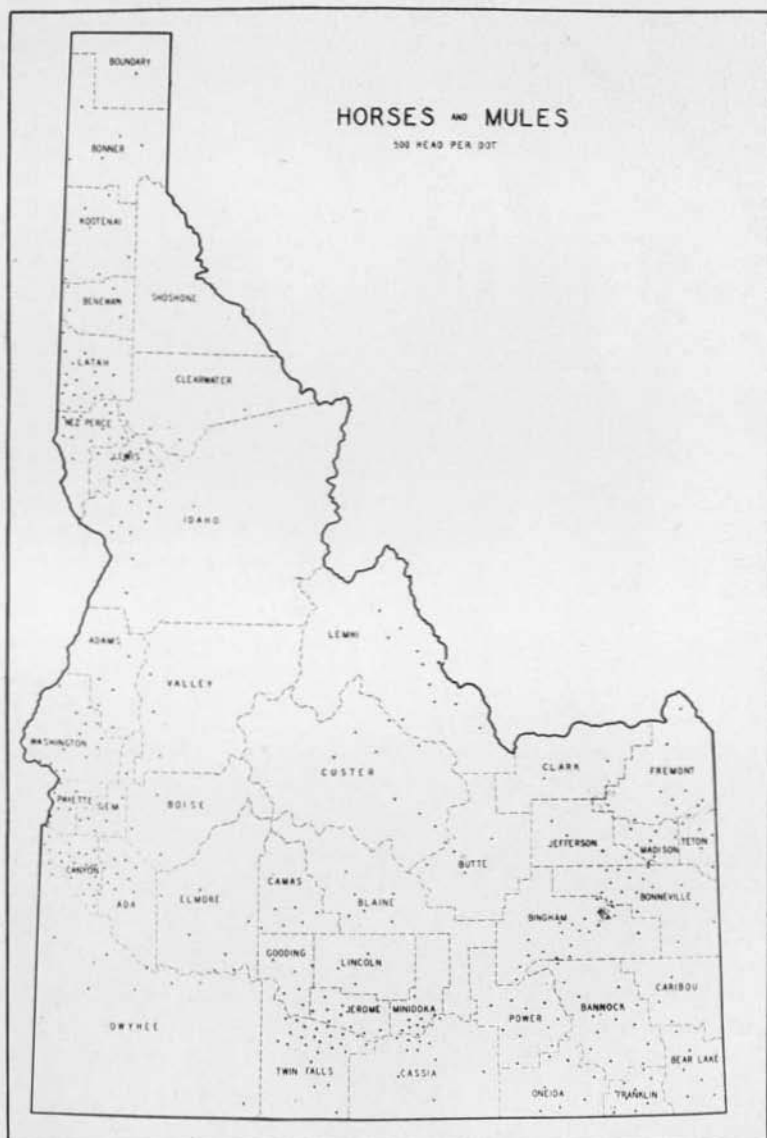


Fig. 26.—GEOGRAPHICAL DISTRIBUTION OF HORSES AND MULES ON FARMS JANUARY 1, 1933. Mules are relatively insignificant, making up less than 4 per cent of the total number of work stock on farms. Twin Falls, Idaho, and Latah counties had the largest number of mules on farms in 1930.

Changes in numbers of livestock on farms January 1, 1922-1934, by producing districts is shown in Figure 25. The grouping of counties into districts is based upon the geography and natural characteristics of the areas with consideration given to the importance of livestock in the farm organization, feeding areas, types of range, uniformity of production practices, and predominant types of farming in the area. If only one class of livestock were being considered a slightly different grouping would be advisable.¹ In interpreting these maps, it should be remembered that the diagrams representing changes in the total number of livestock in the state are on a different scale, and that the magnitude of the fluctuations as shown in the curves cannot be directly compared with individual districts.

Work Stock. It is estimated that 193,000 horses, mules, and colts were on Idaho farms on January 1, 1933. As shown in Figure 24 these work animals are rather evenly distributed throughout the agricultural regions with a slight concentration on irrigated farms. In 1930 all farms in the state averaged slightly over 5 work animals per farm. However, only 82 per cent of the farms reported having either horses or mules on them, thus bringing up the average to 6.3 animals per farm reporting. Ninety-three per cent of the farms in Teton county and 92 per cent in Power county report either horses or mules. Only 6 farms out of every 10 in Caribou and Bonner county had either type of work animal. Power, Custer, and Lemhi counties each had an average of 12 animals per farm, while Bonner, Kootenai, and Boundary counties each had an average of 3 per farm. The usual number of work animals per farm is 5 for irrigated farms and 6 or 7 for non-irrigated farms. Between 1920 and 1930, the number of horses, mules, and colts on farms declined 29 per cent, and between 1930 and January 1, 1934 they declined another 11 per cent, mainly because of the increased size of farms, the decreased number of farms, and the use of more tractors and trucks on farms.

Value of Land and Equipment. In connection with the 1930 census, farmers were asked to report the current market value of their farm land as determined from normal sales of similar land in the community. Although these estimates contain a certain element of expected increases in land value and are influenced to a slight degree by the value attached to the home, it is believed that the values stated are a satisfactory reflection of the relative income producing power of the land. According to these estimates, the average value of all farm land in Idaho was \$8,165 per farm or nearly \$37 per acre in 1930. Irrigated farms had an average value of \$8,338 and non-irrigated farms averaged \$7,812. By adding the value of the farm buildings to the land value it was found that the average value of all farm real estate was \$10,012 per farm. The value of buildings averaged \$2,013 on irrigated farms and \$1,510 per farm on non-irrigated farms. Variations in the value of farm land per acre among election precincts are shown in Figure 27.

¹ The distribution of livestock by districts was determined from estimates of the Bureau of Crop and Livestock Estimates, Reports of Assessors, records of marketings and the census of agriculture.

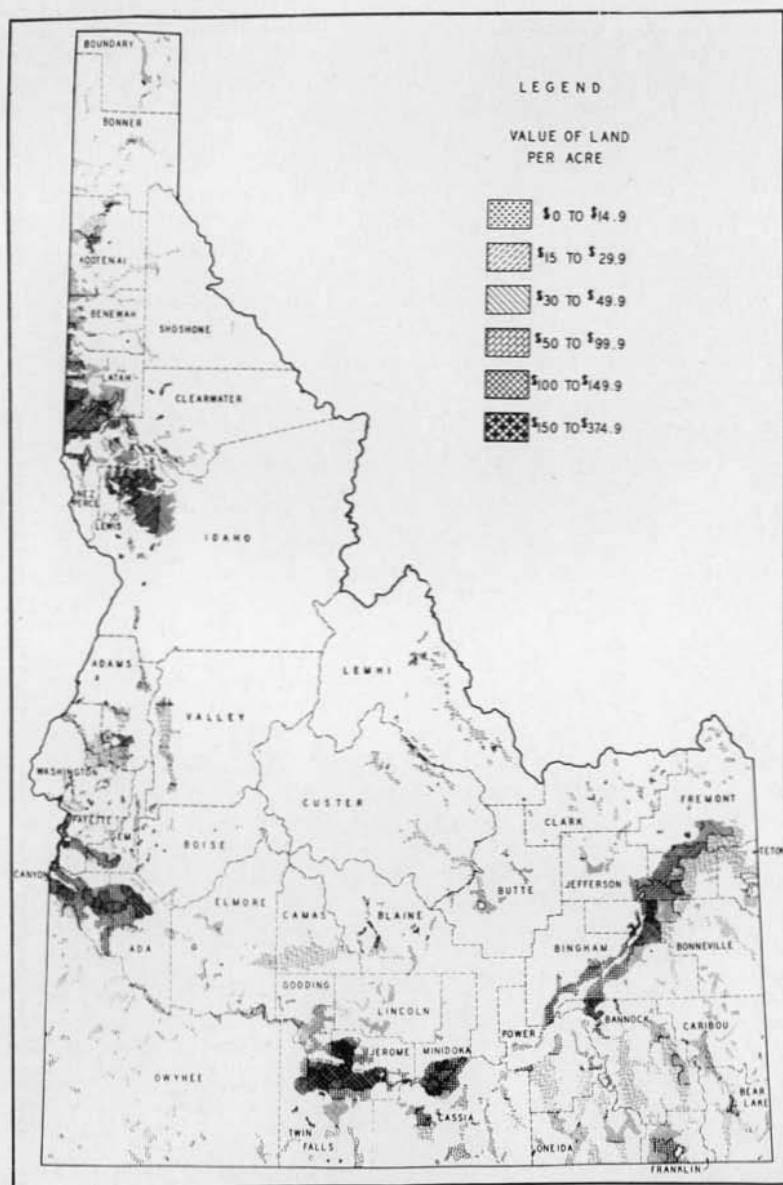


Fig. 27.—VALUE OF FARM LAND PER ACRE IN 1930 BY PRECINCTS. Value of farm land varies from \$2 to \$371 per acre with \$37 as an average for all types of farms. Irrigated farms averaged \$49 and non-irrigated farms averaged \$24 per acre.

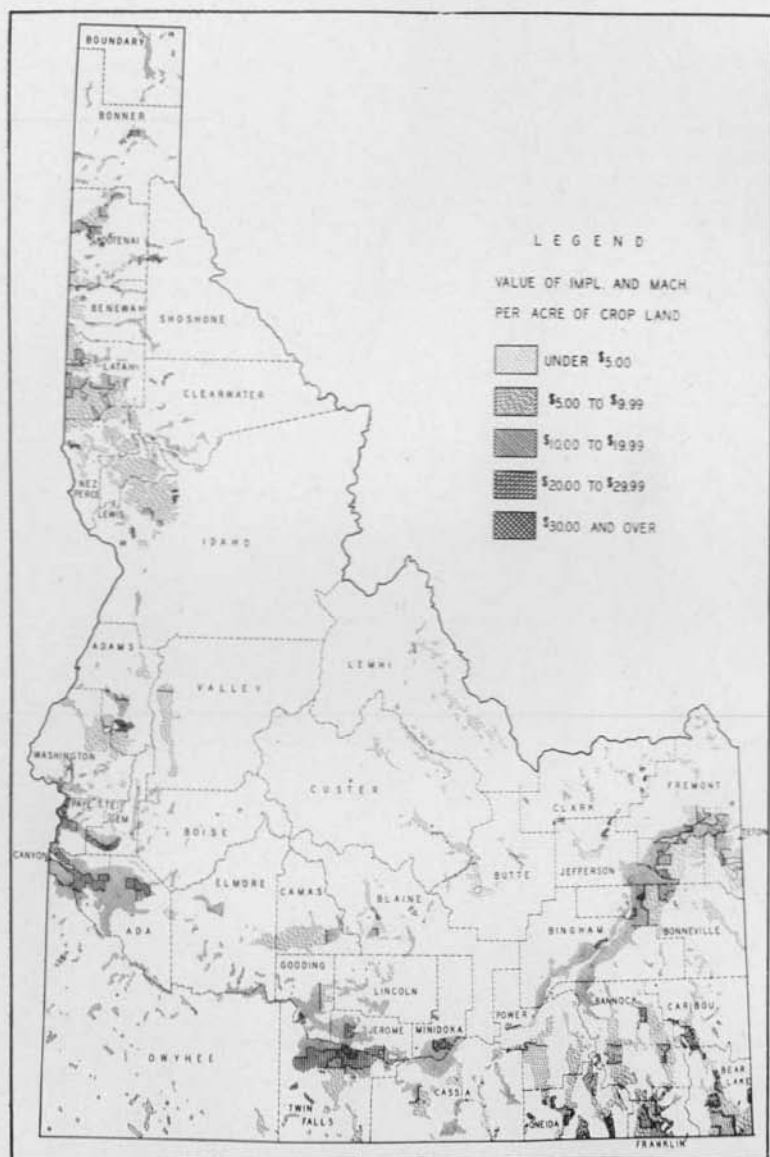


Fig. 28.—VALUE OF IMPLEMENTS AND MACHINERY PER ACRE OF CROP LAND IN 1930 BY PRECINCTS. The value of implements and machinery varies from less than \$1 to over \$50 per acre of crop land among election precincts. Irrigated farms average \$12.52 and non-irrigated farms average \$6.57 per acre.

The value of implements and machinery per farm varies with differences in the size of farms and the type of farming practiced. In 1930 the value of implements and machinery on all farms averaged \$954 per farm, while irrigated farms averaged \$976 and non-irrigated farms averaged \$906 per farm. By reducing these values to a crop acre basis, as shown in Figure 28, these differences between irrigated and non-irrigated areas are more apparent.

MAJOR FACTORS ASSOCIATED WITH TYPES OF FARMING IN IDAHO

The discussion thus far has been mainly confined to the location, description, and use made of the agricultural resources of Idaho. It has been shown that agriculture is confined to a limited portion of the state with considerable variation existing in the intensity of land use, the size and value of farms, and in the numbers, proportions, and types of crops and livestock produced within the farming areas. An appreciation of the problems confronting farmers in their attempts to shape the resources at hand into a profitable farming system, as well as an understanding of the prevailing types of farming, is dependent upon knowledge of the factors associated with the agricultural resources of the state.

These factors are classified, first, as those having a direct causal influence upon the type of farming, and second, those which are primarily the result of the type of farming practiced. Included in the first group are factors such as climate, topography, soils, plant and animal diseases, relative prices received by producers, distance to market, tenure of the operator, etc. The second group includes resultant factors such as shifts in rural population, extent and location of marketing facilities, distribution of population, etc. Before considering these factors individually, it must be remembered that the cause and effect relationship between types of farming and the associated factors, is not always easily distinguished. The true relationship may be so obliterated by the immediate chain of cause and effect relationships that the underlying cause cannot clearly be traced. For example, poor drainage of part of an irrigated tract may be the major factor explaining the reason why a large proportion of the farms in that area are used mainly for pasture. At the same time this factor may be the result of so many other factors, such as the character of the soil, the amount of water used in other parts of the tract, or topography of the area, that conclusions regarding the main cause are little better than hypotheses.



Fig. 29.—RELIEF MAP OF IDAHO. The elevation of Idaho varies from 700 feet at Lewiston to over 12,000 feet at Mount Borah. Most of the farm land in northern Idaho lies at elevations ranging between 2,000 and 3,500 feet while the farming area of southern Idaho ranges between 2,100 and 6,000 feet.

PHYSICAL FACTORS

Topography. The character of the land surface plays an important part in determining the use made of the land resources. The topography of Idaho has greatly influenced the location of farms as well as the types of farming predominant in the state. It is definitely associated with the character, accessibility, and carrying capacity of the range. It affects the size and type of machinery and equipment used on the non-irrigated farms and is a major factor in causing variation in the cost of preparing farms for irrigation. The length of the farm-to-market haul and the size of the load carried is partly dependent upon the topography. Topography, together with other factors, affects the climate of the state through its influence upon air drainage, direction of the wind, evaporation of moisture, distribution of rainfall, and length of growing season. Added relationships between the topography and agriculture of Idaho, many of which will be discussed later, may be drawn from comparison of Figure 29 with others presented in other parts of this Bulletin.

A considerable portion of the land surface of Idaho is rough and mountainous. Most of the eastern boundary is formed by a rugged chain of mountains with numerous spur ranges projecting far out from the main ranges. Many of these mountain peaks rise to an elevation of over 11,000 feet. Occasional open valleys of varying

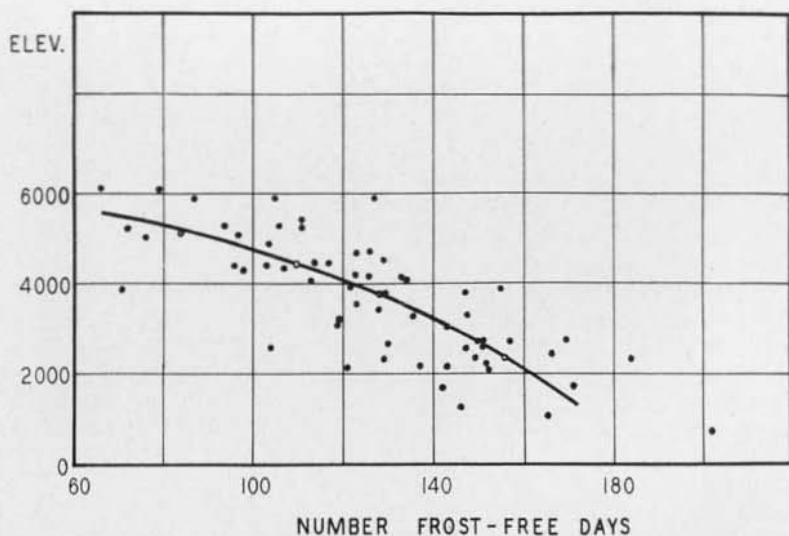


Fig. 30.—RELATIONSHIP BETWEEN ELEVATION AND AVERAGE NUMBER OF FROST-FREE DAYS PER YEAR FOR 62 SELECTED IDAHO STATIONS.

widths and lengths are situated along the principal streams. These valleys in northern Idaho are wide and spread into fairly broad bottom lands. However, in the central portion of the state they are usually deep, narrow, box-like canyons which are practically impassable and of little agricultural value. The more level portion of the state extends on both sides of the Snake River crossing the southern part of the state in a semicircle, and along the western boundary of northern Idaho.

Elevation. The elevation of Idaho is closely associated with the amount of precipitation, the form which this precipitation takes, and the rate at which it is supplied for irrigation purposes through the streams. Much of the precipitation in the mountains falls in the form of snow during the winter months and remains on the higher peaks until late spring and sometimes into the summer. Elevation is also closely related to the length of the growing season. As shown in Figure 30 those stations located at higher elevations generally have a smaller number of frost-free days than stations at lower elevations. The fact that all observations do not fall directly upon the line of relationship indicates that other physical factors also have an important bearing upon the length of the growing season.

Precipitation. Rainfall is one of the limiting factors affecting the type of farming in Idaho. It influences non-irrigated farming in determining the boundaries of the dry-land farming areas as well as the tillage practices which must be adopted to conserve moisture in these areas. Conditions of the range and the degree of finish in livestock marketed are partly dependent upon the adequacy of the rainfall. Irrigation enterprises have found it necessary to limit the extent of their irrigated area because of inadequate water supply. Along with the topography and character of vegetation, precipitation greatly affects the extent of erosion.

Considerable variation exists in the distribution of precipitation. Generally there is a gradual increase from west to east and also an increase of precipitation with increased elevation. Precipitation over the entire state is fairly evenly distributed throughout the year with the largest amount occurring during the winter months. In most areas it is generally lightest during July and August, causing occasional summer droughts in some dry land farming regions. A significant feature of the distribution of rainfall in Idaho is the fact that those areas having the greatest annual precipitation receive a smaller proportion of it during the growing season. Figure 31 shows the average annual precipitation and Figure 32 indicates its monthly distribution at selected points throughout the agricultural regions of the state.

Temperature. Figure 33 shows the monthly range in normal temperature and the average range in extreme temperatures for 12

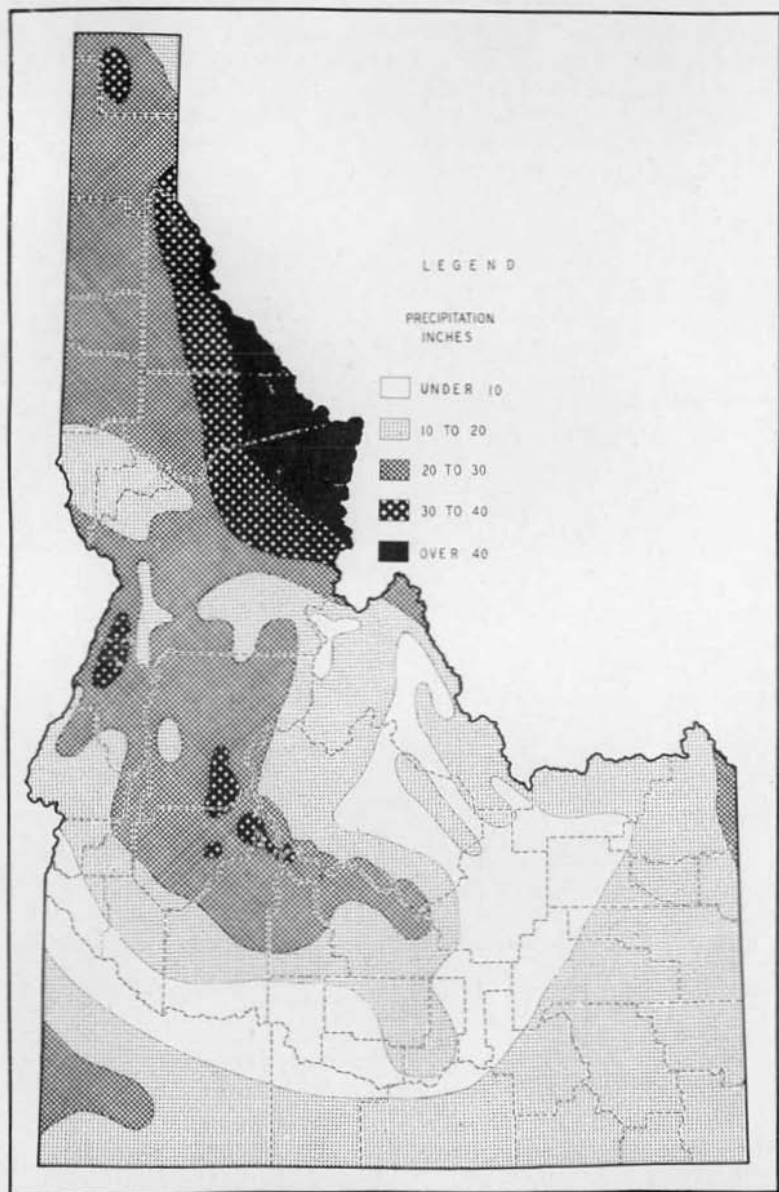


Fig. 31.—AVERAGE ANNUAL PRECIPITATION. The total annual rainfall varies from slightly more than 7 inches in part of Lemhi county to nearly 60 inches in the high mountain ranges along the northeastern boundary of the state. The main irrigated regions lie in a belt having less than 12 inches annually.

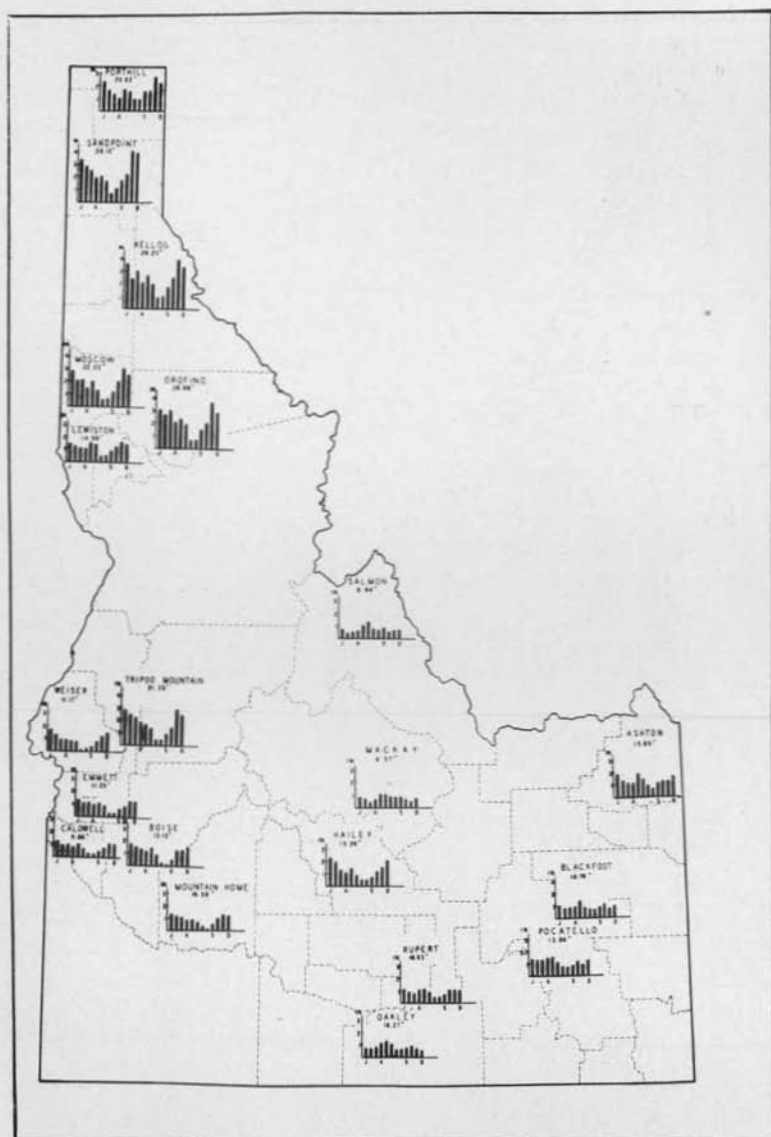


Fig. 32.—AVERAGE MONTHLY DISTRIBUTION OF RAINFALL. Only those stations having 20 or more years of unbroken records ending with 1933 were included. The figures directly below the name of the station represent the average yearly precipitation for that station.

stations located in the main agricultural areas of Idaho. The upper line on each diagram is the average of the maximum temperature for the month over a period of 20 years and the lower line is the average of the 20 years' minimum temperatures. The range in temperature between these lines represents the average range in extreme temperatures for the month. The shaded portion of each diagram shows the average range in the normal temperature by months.

Temperature as well as precipitation is more related to altitude in Idaho than any other single factor. The winters in the areas of low elevation are relatively mild, while in the mountainous areas they are long with extremely low temperatures. Generally the winters in northern Idaho are similar to those in the southwestern portion of the state, but usually both of these areas have higher winter temperatures than the eastern half of southern Idaho. The daytime summer temperatures in southern Idaho are usually higher and the evenings usually cooler than those in the farming regions of northern Idaho. The summer temperature in the mountains is usually cool and only occasionally during the afternoon does it run high. Radiation is extremely rapid and cool summer nights often result in frosts during mid-summer. The extensive plateaus and higher valleys forming a considerable part of southern Idaho are somewhat warmer than the mountainous regions. With the descent from these elevated plateaus to the lower valleys and the Snake River Plains, temperatures rise and frequently exceed 100° during the summer afternoons.

Length of Growing Season. The length of growing season in combination with other physical factors is important in influencing the type of farming. It is highly significant in eliminating certain types of crops from the farm organization, and explains why hay represents the main crop in many sections of the state. The length of the grazing season is also partly dependent upon the length of the frost-free period in the mountain valleys and affects the proportion of sheep and cattle sold as feeders in the fall.

Figure 34 shows the number of frost-free days for each year recorded, for the period 1913-1932. Comparison of the differences in length of growing season for individual years, at the same station, indicates the degree of probability to which a short season will affect the maturing of crops in that area. For example, note the extreme uncertainty in the length of the growing season at New Meadows compared with the relative certainty of the season in the Caldwell and Lewiston areas.

Soils. Space does not permit a detailed discussion of the many soil types found in Idaho, and because other publications treat this important factor more adequately, consideration here will be confined

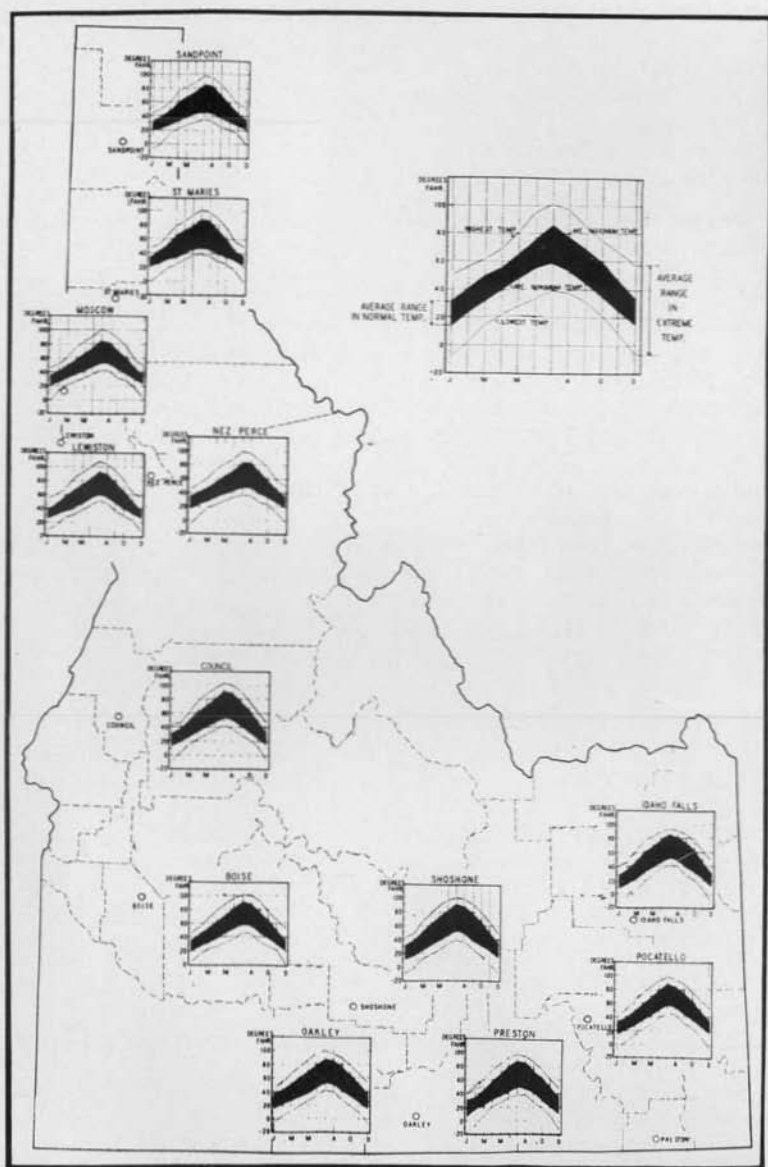


Fig. 33.—AVERAGE RANGE IN NORMAL AND EXTREME TEMPERATURES BY MONTHS. Comparison of this figure with Figure 31 shows that the areas of high temperature roughly coincide with the regions of lowest annual precipitation.

mainly to the way soils have influenced the type of farming in Idaho.¹

Soil as a factor influencing the types of farming is more local in its effects than many of the other factors. It is of primary importance in explaining the distribution of crops within an area having approximately similar climatic conditions, but is only one of many factors which must be considered in explaining differences in the cropping systems among areas. Each crop is usually partial to soil having certain characteristics, but most crops will respond in some degree to every type of soil. The type of soil, therefore, is the main factor explaining the relative adaptability of crops to an area, and sometimes determines whether certain areas can profitably be used for agriculture at all.

Soils do not change rapidly in physical or chemical structure but they are subject to depleted fertility and erosion when not properly handled. This may greatly change their adaptability to certain cropping systems and eventually change the type of farming in the area. Some of the older non-irrigated cash-crop regions of northern Idaho have been so affected by erosion that yields on the hill tops are only half as large as on other parts of the farm. In order to reduce erosion and build up fertility, grasses may become an important crop on these non-irrigated farms, resulting in the introduction of more livestock into northern Idaho. Because of the very limited original fertility of other non-irrigated areas of southern Idaho many wheat farms have been cropped for several years and then abandoned. The effect of several years of cropping greatly reduced the value of these areas for grazing when they finally passed back into range use.

The character of the soil also is extremely important in affecting irrigated farming. Sandy soils require several times more irrigation water per acre than the heavier soils. They also require a different system of crop rotation to maintain their fertility and demand different cultural practices to avoid blowing. Clay soils, on the other hand, require more labor in cultivation, and special technique in their tillage.

The character of the sub-soil influences the frequency of irrigation, the extent of seepage, and often the accumulation of alkali. Much of the area of southwestern Idaho contains alkali soils, but

¹ A generalized soil map of Idaho is contained in Idaho Experiment Station Bulletin 151, "The Farming Business in Idaho."

Detailed soil surveys have been published for Kootenai, Latah, Nez Perce, and Lewis counties in northern Idaho and for the Boise area, Gooding area, Twin Falls area, Bear Lake Valley, Minidoka area, Blackfoot area, Portneuf area, and the Soda Springs-Bancroft area of southern Idaho. The field work has been completed in Benewah and Bonner counties but the published surveys are not yet available.

The following Idaho Agricultural Experiment Station publications contain valuable information on soils. Bulletin 107, "Soils of Latah county;" Bulletin 114, "Slick Spots of Middle Western Idaho with Suggestions for their Elimination;" Bulletin 118, "Soil and Climatic Factors in Relation to Crop Production on the Palouse Silt Loam of Idaho."

difficulty is experienced only in sections where the salts have leached from higher levels and concentrated in the lower lands. In several northern Idaho counties the peat soils require special methods of cultivation and present grave drainage problems in those areas which are subject to annual overflow from nearby streams.

BIOLOGICAL FACTORS

Insect pests, rodents, plant and animal diseases, and weeds affect agriculture through their effect upon the returns received from the farm business. Some of these pests and diseases are generally distributed throughout the state, while others are more local in-so-far as they influence particular types of farming in one area, while they have an insignificant effect upon identical types in other areas.

Insect Pests. Of the orchards pests the codling moth is probably the most common, being found in every fruit section of the state. The cherry fruit fly is found mainly in northern Idaho, with Benewah, Latah, and Nez Perce counties under quarantine. The San Jose scale has also been present in Idaho for a long time.

The beet leafhopper is probably the most serious insect pest. It is especially prevalent in the Snake River districts and has driven sugar beets from the cropping system in several areas. In some cases the loss of this cash crop has disrupted the farm organization and placed the area practically on a one-crop basis. The Colorado potato beetle at present is found to a limited extent over northern Idaho and along the upper Weiser River. Adams and all counties in northern Idaho are quarantined for this bug. If the main potato producing sections should become infested with the potato beetle, the added cost of spray material might cause radical shifting of crops in some of the marginal producing areas. Alfalfa growers are seriously threatened some years with alfalfa weevil. This pest was first discovered in the southeastern part of the state over 25 years ago. Quarantine orders of 1913 prohibit shipment of hay and alfalfa seed from Bear Lake and Oneida counties. Since then all counties of southern Idaho have been placed under quarantine. The result has been an increased production of livestock to consume hay which is produced as a restorative crop on irrigated farms.

Rodents. Ground squirrels of various species distributed over the entire state are mainly destructive to growing grain. They often cause damage to irrigation canals and ditches and in some areas much loss of livestock range is caused by this pest. The black-tailed jack rabbit inhabits practically all of southern Idaho, and is responsible for considerable loss to farm crops and to fruit trees on farms at the outer edges of the irrigated tracts. Cases are known where farms have been abandoned because the ravages of rabbits

destroyed the crops. Pocket gophers and rats on some irrigated areas increase the cost of leveling and irrigating as well as the maintenance of the enterprise.

Weeds. Losses sustained by farmers because of the presence of weeds in their crop amounts to an enormous sum. Early in the history of a newly developed agricultural region the problem of weed control is of very little importance. As agriculture becomes established weeds begin to appear and must be considered in the farming practices. Idaho has passed from the former to the latter stage. Cultural practices and rotation are being changed to provide for their control. In many sections summer fallow is practiced to control weeds when rainfall is sufficient to produce a crop each year. This practice increases the cost of production and may not provide for the best use of the land. Other sections formerly devoted to single crop farming have introduced other crops partly because of the encroachment of weeds.

Animal Diseases. In general, animal diseases are probably less prevalent in Idaho than in most parts of the United States. This fact is probably due to the distribution of livestock over a wide area and the healthful climatic conditions. Although tuberculosis, abortion disease, and hog cholera are the three major diseases the losses to the livestock industry from these sources are possibly no greater than losses resulting from plant poisoning.

Other Biological Factors. The biological factors discussed thus far all operate to reduce the income on farms and affect the type of farming. Another group of biological factors includes those which aid farmers in overcoming their unfavorable environment. Of particular significance is the development of new varieties of crops and strains of livestock. Wheat production in Idaho has been affected by the development of higher yielding wheat on both irrigated farms and high altitude non-irrigated farms. White fly resistant beets are being introduced and may materially increase the area producing this crop. Mosaic resistant strains of beans allow this profitable crop to expand in several areas of central Idaho. Rigid inspection gives other areas an advantage in production of seed crops. Scientific selection and breeding of sheep has resulted in production of large, rapid-growing lambs which enable Idaho producers to compete more favorably with other producing areas. These represent only a few of the many ways farmers have shaped their types of farming with the aid of biological forces.

ECONOMIC FACTORS

Although considerable importance is usually attached to the physical and biological factors as affecting the type of farming, it should be remembered that they represent conditions which must

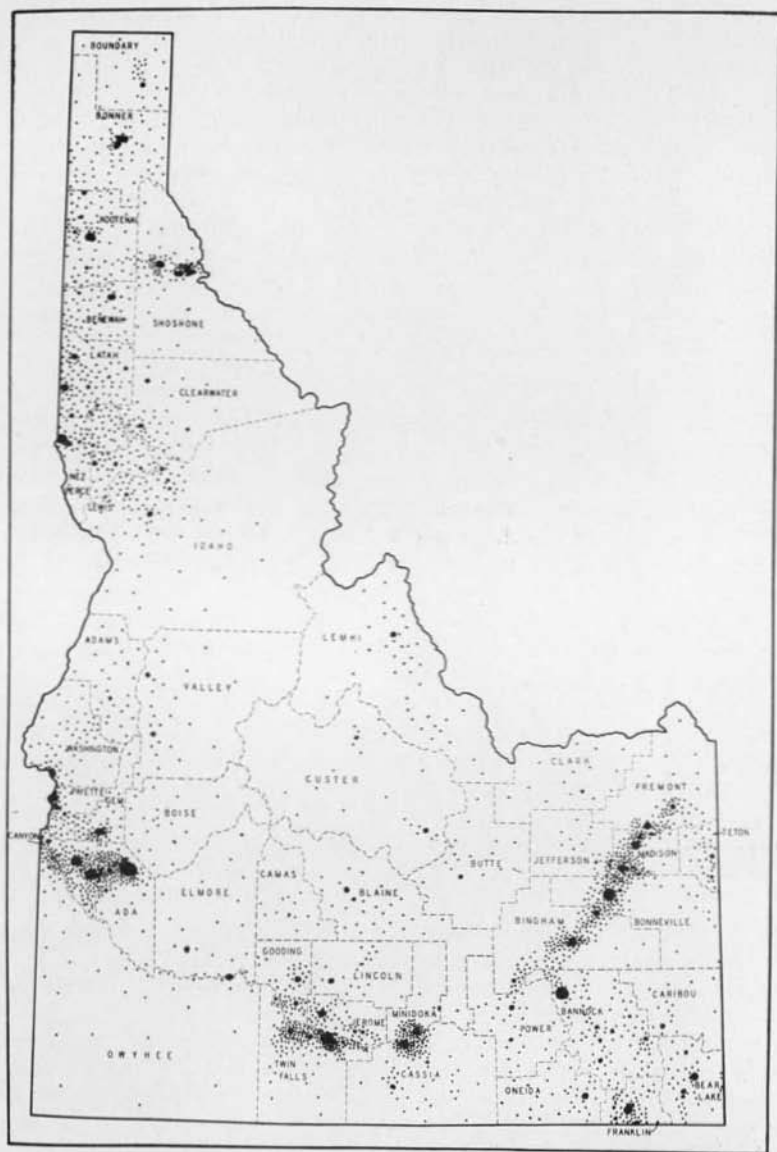


Fig. 35.—DISTRIBUTION OF POPULATION IN IDAHO IN 1930. (Each dot represents 100 persons). The total population in 1930 was 445,032, of which 29 per cent was urban and 71 per cent was classed as rural. Of the rural population only 59 per cent were on farms.

either be used, or overcome, by the producer in his attempt to secure the greatest net returns for his effort. The major economic factors affecting his net returns are the prices received for the products he sells and the cost involved in their production. The relative prices received are in turn affected by other local, national, and international economic forces entirely out of the control of the individual farmer. About all he can expect to accomplish must come from his ability to mold the farm organization in such a way that he is at all times directing his effort along the most remunerative channels. The extent to which Idaho farmers attempt to shift their production to the most profitable combination of crops is well illustrated by their response to changes in the price relationship. Studies of farmers' response to price changes indicate that most farmers in Idaho have in the past increased the acreage of those crops which gave favorable returns for the past two seasons and decreased the acreage following seasons of low prices. Incidentally these shifts have been made at the wrong time, but they indicate that farmers are trying to change their systems to take advantage of economic factors. Livestock producers also gradually shift their production. This is revealed by the number of cattlemen which shift to sheep production when the relationship between cattle and sheep prices favors the change.

Idaho is situated at a considerable distance from the consuming centers of the nation. High freight rates necessitate the shipment of products having a high value relative to their weight and bulk. Livestock feeding has largely solved the problem of disposing of the hay produced, while the production of high quality crops increases their value to the point where they command a premium on the markets thus making their shipment possible. As shown in Figure 35 the urban population is small and distributed widely in small communities throughout the farming regions. A few truck, vegetable, and dairy farms supply these communities with food but in general local markets absorb only a small proportion of the products produced in the state.

The supply of labor is generally effective in determining the intensity and stability of farming operations. Figure 36 shows the changes in rural population between 1920 and 1930. Judging from the radical shifts which have occurred over this period one would be led to the conclusion that agriculture in Idaho is far from a stable and completely developed industry. Many areas have not been developed long enough to allow the growth of intensive farming or to enable farmers to determine the most profitable combination of their enterprises. Much of the increase in Shoshone, Clearwater, and Valley counties represents an attempt of individuals, many of them coming from other occupations, to earn a living on part-time and self-sufficing farms.

