

WHEAT FARMING

In the Columbia Basin
of Oregon

Part 1. *Major Characteristics of Agriculture*

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Part 1. *Major Characteristics of Agriculture*

Introduction

Two-thirds or more of the wheat grown in Oregon is produced in the Columbia Basin portion of the state, an area that is part of a larger wheat producing region extending from north central Oregon through eastern Washington and northwestern Idaho. Generally favorable physical and economic conditions in the Basin have led to a high degree of specialization in wheat farming. As a consequence, this part of the state has become known as the Oregon wheat area. In most of the area precipitation varies from 8 to 16 inches, which generally limits crop alternatives to grain crops and grasses. In parts of the area with higher rainfall, particularly the eastern and western parts, wheat can be grown annually or in rotation with other field crops. In the parts with lower rainfall, it is necessary to store soil moisture by an alternate crop and fallow system for the successful production of wheat.

The tillable land of predominantly sloping plateaus and rolling hills is intersected by canyons of varying depth with more or less steep walls not suitable for cultivation and often of little or no value as grazing land. The soils vary considerably in different parts of the area from deep, light-textured, permeable soils to shallow soils having medium-textured surface soil, underlain by impermeable subsoils or bedrock. Water and wind erosion aggravated by earlier production practices have been a problem on many farms. However, recent practices, such as seeding of waterways and steep slopes to grass, stubble mulching, strip-cropping, and the construction of broad-based terraces have been beneficial in reducing these hazards.

Large-scale operation of wheat farms was prevalent even before crawler tractors replaced animal power and hillside combines replaced binders or headers and stationary threshing machines. This was especially true where an alternating crop-fallow system had to be followed. Since the introduction of mechanical power and complementary equipment, the size of operation has been increased greatly. With animal power, one section of land required the labor of one or two men with hired help during rush periods. With modern equipment two sections or even more are not too much for one man with seasonal help. This revolutionary change of substituting

capital in the form of land and equipment for labor has further increased specialization and made wheat farming in the Columbia Basin big business, leaving little room for farmers with small acreages.

Land that is too steep or poor to use for wheat production is scattered throughout the cultivated area. Although modern machines and methods have permitted some of this land to be brought under cultivation, there remain irregular and scattered areas that can be used only for grazing. Furthermore, surrounding the major cultivated areas are forested or open lands not suitable for cultivation, held in private or public ownership. These nontillable lands are used extensively for grazing and provide the basis for livestock production on stock ranches or livestock enterprises on wheat farms. A few head of cattle are kept on many specialized wheat farms, but, as the amount of grazing land for summer feeding is generally scattered and insufficient, the livestock enterprises are usually of little commercial significance. Where larger blocks of grazing lands are available within the wheat area proper, and particularly where public and private ranges are extensive, cattle and sheep ranches are found in considerable number.

Of minor importance, as far as land use in the five counties of the wheat area is concerned, are a few areas in which surface or underground water sources permit irrigation of intensive crops. Some irrigated land used primarily for hay and pasture is found along creeks traversing the wheat area. Larger blocks are located in western Wasco County and in Umatilla County, where fruit and vegetable production and some dairy production are significant. Irrigation of wheat is not common, although it occurs occasionally where wheat is grown in rotation with more intensive crops.

A major economic factor affecting agriculture in the wheat area is the wheat surplus situation with its existing industry-wide programs aimed at reducing wheat production. Because most farmers operate on a wheat-summer-fallow basis, have inadequate range land for a cattle enterprise, and can produce only grain crops on their cultivated land, the only practical alternative to wheat is the production of barley. The wheat allotment program, which involves a reduction of 35 to 40% in the acreage

of wheat grown during the base period, has, therefore, caused a relatively large shift to barley. In most parts of the Columbia Basin, however, barley is a high risk crop, subject to considerable frost damage if sown in the fall. Efforts are being made to develop varieties with resistance to frost, but in some localities farmers are forced to grow spring barley, which they do reluctantly because of higher operating costs caused by additional spring operations prior to planting. Furthermore, the land summerfallowed during the preceding year is subject to greater erosion during the winter. On farms with a basis for a livestock enterprise, some of the poorer outlying cropland has been shifted to grass. The proportion of cropland diverted to grass, however, is very small. There are other minor organizational changes which farmers have made in specific situations to adjust to the wheat allotment program but these have had little effect upon the aggregate land use in the area.

In contrast to rather uniform compliance with wheat allotment programs, cooperation by wheat farmers in the Soil Bank has been relatively small. The reasons for this may be found in several factors. First, the Soil Bank is entirely optional. Second, cooperation in the Conservation Reserve constitutes a reduction in the operating unit. On

the other hand, the allotment program and the use of modern equipment and methods have tended to encourage larger operating units. The enlargement is made to take greater advantage of economies in scale and maintain or increase total income. Therefore, unless the land is of low quality, is expensive to operate and maintain because of soil or location, or is in small, uneconomic units, participation in the Soil Bank runs contrary to existing economic trends in wheat farming. Furthermore, because of the limitation of \$5,000 per farm, the retirement through the Conservation Reserve Program of land held in small units or operated by farmers who have not been able to adjust the size of their business to changing economic conditions is possible only in isolated cases.

More detailed information about the effects of adjustments to current and proposed programs designed to cope with the wheat surplus situation will be presented in a subsequent report. It may suffice here to state that various wheat programs and the cost-price relationships existing during the past decade have been a strong incentive for farmers, not only to enlarge their business and to adopt modern practices as rapidly as possible, but also to carefully protect their wheat acreage history on which current programs are based.

Types of Farming and Major Land Use

The Columbia Basin wheat area, consisting of the counties of Wasco, Sherman, Gilliam, Morrow, and Umatilla, represents one-tenth of the land area but nearly one-fourth of the land in farms within the state. The area contains over one-third of the cropland of the state.

Agriculture in each of the five counties differs from that in the others primarily because of topography, soils, and climate. It seems desirable, therefore, to state briefly the situation in each county before discussing the area as a whole.¹

Wasco County on the western edge of the wheat area is the second largest county of the Basin in land area. It has a variety of natural conditions which cause greater differences in agriculture than in the centrally located counties. The western part of the county extends into the Cascade Mountains, which provide summer range and are the source of irrigation water for relatively small farms at lower elevations. Due to adverse topographical and soil conditions for intensive crops, hay and pasture are the major land uses of irrigated land in most localities. Near the county seat of The Dalles, important fruit production is found on generally small units, some of which are irrigated. The southwestern part of the county includes part of the Warm Springs Indian Reservation where most of the land is used for grazing. The units,

which are operated by the Indians themselves, are small, but most of them include a few acres of wheat. In the southern part of the county, particularly in the southeastern corner, soils are of relatively low productivity and are used primarily for grazing in large units. A few large wheat farms are found here in the more favorable locations. The major wheat producing area of Wasco County is in the northeastern part, where productive soils and favorable topography have resulted in relatively high yields.

The overall topography of the county is rough and individual farms are often cut up by canyons and wasteland. The percentage of the total land area occupied by farms is the lowest of any county in the wheat area. Total land per farm is fairly high, but the acreage of cropland per farm is the smallest of any county in the Basin. The main reasons for a low average acreage of cropland per farm are the relatively large number of irrigated units specializing in forage or intensive fruit production, and the number of farms operated by Indians on the Reservation. Small acreages in the northern part of the county have enough precipitation to permit annual cropping on nonirrigated land.

Livestock production in the county is important in the utilization of land not suitable for cultivation and the use of nearby rangeland. Beef cattle and sheep are kept primarily outside the specialized wheat area. Over the county as a whole these livestock enterprises are somewhat smaller than in other counties of the Basin, although large ranches are found in the southern part of the

¹The following discussion of the agriculture in individual counties is based primarily on the U. S. Census of Agriculture, 1954. Preliminary data from the 1959 census were used as far as they were available. Statistical source material has been condensed in Appendix tables 1, 2, and 3.

county. Dairy and poultry production near population centers are of some significance. The number of hogs per farm as reported in the 1959 Census was larger for Wasco County than for any other county in the Basin.

Farms classified as cash-grain farms are most important, numbering nearly one-third of the total. Next in importance are farms classified as vegetable and fruit farms, constituting nearly one-fourth of the total. Live-stock farms other than dairy and poultry farms rank third. The relatively large proportion (24%) of miscellaneous and unclassified farms, including farms selling forest products, indicates major diversification as well as some part-time farming. The average value of sales of farm products per farm is low compared with that in other counties of the Basin. A considerable number of farm operators do not live on the farm; many operators also find additional employment in other occupations such as the lumber industry. Thus, in Wasco County wheat production is the most important single enterprise, but agriculture as a whole is more diversified than in any other county in the Basin except Umatilla County.

Sherman County is sometimes referred to as the heart of the Columbia Basin wheat area. It is the smallest of the five counties in size, but it has the highest proportion of land in farms. In addition, cropland as a percentage of total farm land is higher than for any other county in the area. The lack of surface sources of water permits irrigation only in a few cases by sprinkler. Land productivity varies considerably between the northern, generally more productive part of the county, and the southern part where some land is marginal in productivity in dry years. Compared with the other counties, Sherman County has only a few steep slopes of little agricultural value. Since the acreage of cropland per farm is relatively large, there is little land available for grazing. On many of the wheat farms some beef cattle are kept, but the enterprise is generally small because of the lack of summer feed. All livestock enterprises are less important in this county than in the other wheat counties. This is particularly true of sheep and dairy enterprises.

Because of relatively low precipitation, wheat is produced on an alternate crop-fallow basis throughout the county. Operating units are fairly large in comparison with the other counties, but more land is rented than owned and the number of full tenants exceeds the number of owners or part-owners. High specialization in wheat production is evidenced by the high proportion of commercial cash-grain farms in the total of all farms (86%). More than 70% of all farms in the county had a value of farm product sales in 1959 of over \$20,000, and only 7% of all farms were classified as part-time or residential units. Only a few operators do not live on the farm which they operate, and off-farm work is reported by an insignificant number.

Gilliam County is known for its extensive wheat and cattle enterprises. The proportion of its relatively small land area that is in farms is higher than for Sherman County, but considerably less of the land in farms is used

for cropland. Total acreage reported per farm was approximately 3,900 acres, of which 1,300 acres were cropland. This is a larger acreage per farm than for any other county in the area. The noncropland in farms is fairly well distributed throughout the county, and in contrast to the other counties only a few farms have insufficient rangeland for a minimum cattle enterprise. Most cattle enterprises are large, but other livestock is unimportant except for some sheep enterprises.

The average wheat yield is fairly low and varies little among different parts of the county. Much of the cropland soil is light. Wind erosion occurs in the northern part of the county, where light sandy spots are under cultivation. In the southern part where rainfall is higher and topography rougher some water erosion is encountered. However, since most of the wheat is grown on level or moderately sloping land, the problem over the county as a whole is not serious. Next to Sherman County this county has the smallest area of irrigated land in the Basin. Land values are comparatively low, but total investment per farm is the highest in the wheat area due to the large scale of operation.

Most of the farmers own land, but a high percentage of them rent additional land to enlarge their units. Off-farm work is insignificant partly because of the large scale of operation and the fact that a sizeable livestock enterprise is possible. Also, there are few employment opportunities in the area. On-farm residence of the operator is the general rule. Although most farms are classified as cash-grain farms, there are many so-called general farms deriving their incomes from the sales of both grain and cattle. The value of sales of wheat on these farms is usually higher than that of cattle. Total value of farm product sales per farm in 1954 was the highest of any county in the Basin. However, a larger portion of the total value consisted of sales of livestock. As in Sherman County, only a few part-time or residential farms were reported.

Morrow County is large in land area but next to Umatilla County has the smallest percentage of land in farms. A military reservation in the northern part of the county and public forest land in the southern part account for much of the public ownership. Land used for wheat production is concentrated in the central part of the county, chiefly along the west side. In the northern, eastern, and southern portions grazing is practically the only land use. The division between wheat farms and stock ranches is more pronounced than in Gilliam County. Wheat farms usually lack sufficient range for a livestock enterprise, and stock ranches have little land that can be used for crop production. Fertile creek bed lands in the east-central part of the county are irrigated. Alfalfa and other forage crops, including pasture, are produced here, with only a small acreage of intensively cultivated crops. Morrow ranks behind Umatilla and Wasco counties in total land irrigated, but the areas irrigated are less concentrated than in the other two counties.

The topography of the northern and central parts of the county is level to gently rolling, while in the southern

part it is rough. Soils in the northern part are light, some of them subject to wind erosion. Low precipitation in this part of the county often results in low yields and failures in dry years. Wheat production is more stable and higher yields are obtained in the centrally located areas. County average yields are similar to those in Gilliam County, but over a period of years they may average slightly lower. Despite a substantial increase in recent years in the number of beef cattle on farms, the county remains an important area of sheep production concentrated on large ranches in the southern part. A few large dairies are found in the irrigated part of the county. The average value of milk sold in 1959 was larger than in Sherman and Gilliam counties.

Cash-grain farms are most numerous in Morrow County, followed by range livestock farms. The number of dairy farms is larger than in any other county of the Basin except Umatilla County. However, the value of sales of crops for the county as a whole is over three-fourths of the value of all sales. Total value of sales per farm is above the average for the wheat area in spite of the relatively large number of noncommercial (part-time and residential) farms. The high value of sales of farm products on some farms is supplemented by the sale of forest products. The majority of farmers live on the units they operate. Off-farm work is more important than in Sherman and Gilliam counties which explains the substantial number of part-time farms.

Umatilla County is not only the largest but also the most diversified county in the Oregon wheat area. Higher precipitation in the eastern part than in the central and western parts of the county, and relatively large irrigated areas are the chief reasons for this diversification. The wheat growing area is located in the central part of the northern half of the county and is divided into a wheat-summerfallow area and an annual cropping area. In the annual cropping area, wheat is grown in rotation with peas for canning and freezing or with other annual field crops. Less than three-fourths of the land area is included in farms, since large sections in the southern and eastern parts are in national forests. But the ratio of cropland to total land in farms is relatively high; next to Sherman County it is the highest in the Basin. The major areas of irrigation are concentrated in the vicinity of Milton-Freewater and Hermiston, and to some extent near Echo. The importance of irrigation is further indicated by the fact that two-thirds of all farms in the county reported irrigated land. The average acreage, however, is relatively small.

The Wheat Area

Major land uses and number of farms by type and income classification are compared for individual counties in the wheat area in Figures 1 and 2. These illustrations show the importance of grain and livestock production and the relatively high value of sales per farm in all counties. They also illustrate the extent of diversification

Farms classified as cash-grain farms are most numerous in the county, followed by livestock farms other than dairy and poultry. The number and proportion of dairy and poultry farms is considerably larger than in other wheat counties. There are also a large number of fruit and vegetable farms, primarily on irrigated land, but total cropland included in these farms is of minor significance in overall land use. About 40% of all farms in Umatilla County have been grouped under miscellaneous and unclassified farms. These units are devoted to the production of horticultural and other specialties, derive their income predominantly from the sale of forest products, or are diversified farms with relatively low income of a residential or part-time nature. While most of the farmland is owned by the operators, a sizeable amount is rented. Owner-operated farms consist chiefly of small units; part-owner operated farms, which include most wheat farms and stock ranches, are considerably larger. Units operated by tenants are relatively small.

Range cattle and sheep are equally important in the utilization of noncropland on farms and on public ranges surrounding the major farming area. However, of major significance in the county are the number of dairy cows kept and hogs produced. The average size of dairy enterprises is larger than in Wasco County. Hog enterprises have been increased recently both in number and average size.

Because of the large number of small part-time farm units in the county, the average value of sales of farm products per farm is low compared with the level of sales in the wheat area as a whole. Next to that in Wasco County it is the lowest in the Basin. The number of farm operators not residing on their farms is small, but over 40% of the farmers reported income of the family from off-farm sources exceeding that from the farm. A substantial amount of off-farm work was reported by 39% of the farm operators. This is over two-thirds of all farm operators in the Basin who supplemented their farm income by off-farm work of 100 days or more. Nearness to population centers and availability of seasonal employment in processing plants and in the lumber industry offer more opportunity for off-farm employment in Umatilla and Wasco counties than in the centrally located Sherman and Gilliam counties, and to some extent Morrow County. On wheat farms and stock ranches in Umatilla County, however, incomes are sufficiently large to preclude the need for off-farm work to supplement family income. Total wheat acreage in the county is the largest of any county in the Basin.

and the somewhat lower value of sales per farm in the larger counties of Umatilla, Wasco, and to some degree in Morrow County.

Although there are a number of major differences in agricultural production within individual counties, the many similarities, including the emphasis on wheat pro-

duction, led to the designation of the Columbia Basin in Oregon as a special economic area for which additional data were obtained in the 1954 Census of Agriculture from a sample of farms. These data are presented in a condensed form in Appendix Tables 4, 5, and 6 to illustrate further the predominant size of operation, type of land use, amount of investment in land and buildings, kind of livestock enterprises, and extent of off-farm employment by various classifications of farms.

Cattle and sheep ranches are largest in overall size, but on the average have only a small acreage of cropland. Cash-grain farms are next in size, but have a considerably larger acreage of cropland. Cultivated summerfallow was reported for most cash-grain farms indicating the predominant wheat-summerfallow type of operation. Few cash-grain farms have irrigated land. General farms have been shown separately (Appendix Table 4), because for the most part they are a mixture of cash-grain and livestock farms, with wheat and cattle or sheep constituting the two major sources of income. They are smaller in acreage than either cash-grain or livestock farms; fewer report summerfallow; more have irrigated land.

Because of relatively small size of operation, off-farm work of the operator is more significant than on livestock or cash-grain farms. Other classified farms, consisting of those producing field crops other than grain and vegetable, fruit and nut, dairy, and poultry farms are important in total number but are generally small. As previously pointed out, they are concentrated in Umatilla and Wasco counties.

The classification of farms by value of sales of farm products shows the relationship between size of operation and value of sales and the increasing importance of off-farm work as the size of farm business declines.

Over one-third of all farm operators in the wheat area own all of the land they operate. Because this group includes a large number of small farms of miscellaneous types, the average acreage in owner-operated farms is considerably smaller than that of part-owners and tenants. Omitted from the tabulation of data by tenure of operator (Appendix Table 6) is a small number of farms operated by managers, as well as other farms for which tenure information was not available.

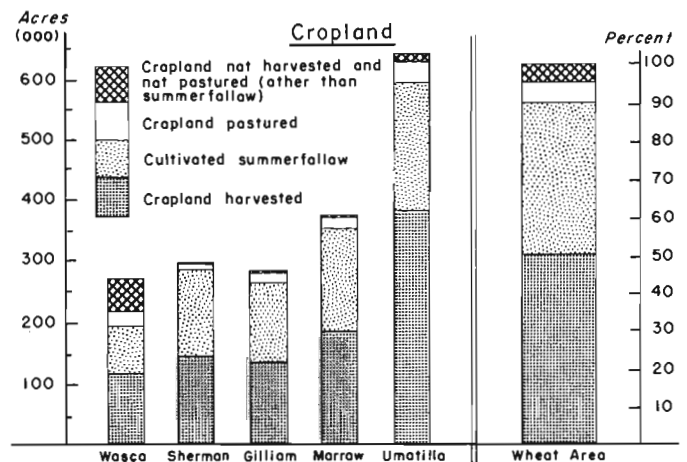
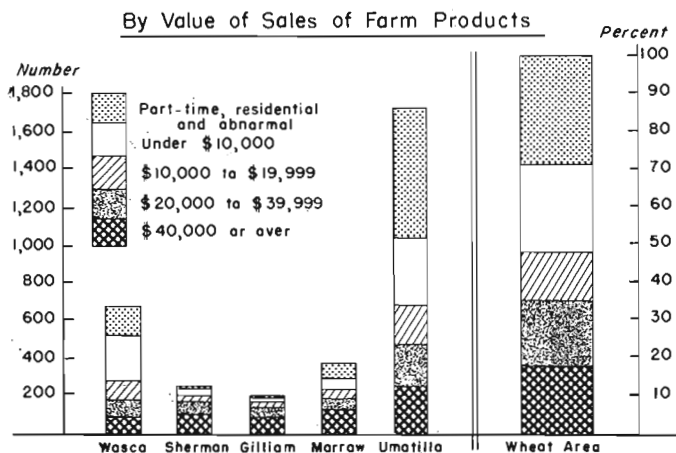
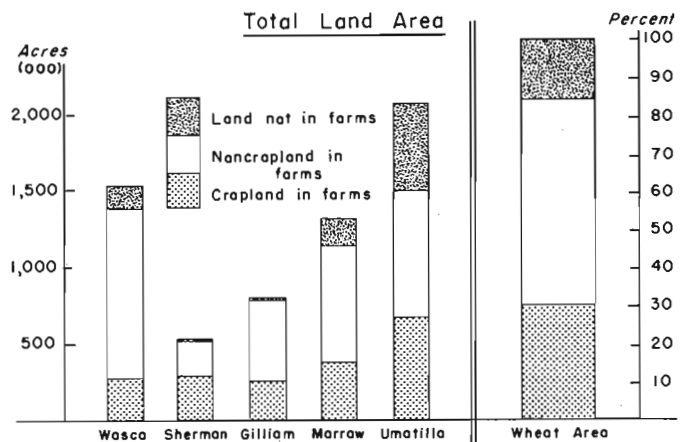
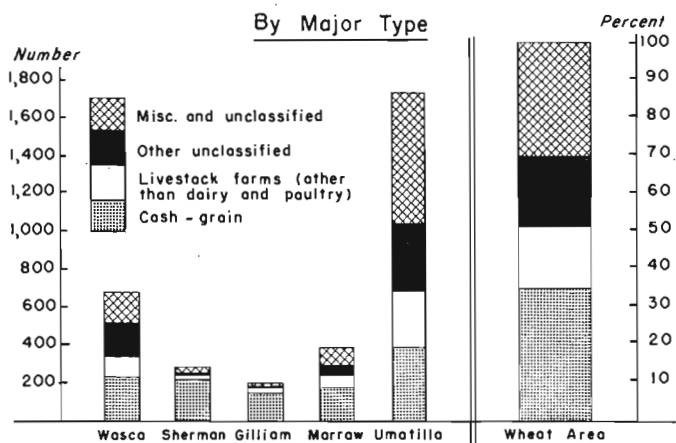


FIGURE 1. Comparison of number of farms classified by major type and value of sales of farm products by counties.

FIGURE 2. Comparison of total land area, land in farms, and cropland uses by counties.

Wheat Farm Organizations

Attention is now directed to a classification of those farms in the Columbia Basin on which wheat is produced. Information is from the records of the Agricultural Stabilization and Conservation Committee (ASC). These records were analyzed for each of the counties for the years since 1954—the year the current wheat allotment program was initiated. Data include total farmland, cropland, wheat acreages, and productivity level for each farm unit. The administration of the program, particularly compliance checks, required accurate data supported by measurements in the field and on aerial photographs. For this reason and because of general farmer compliance, it is believed that data from this source are the most accurate and complete information available.

A comparison of census data with ASC records, as shown in Table 1, supports this contention. In examining this table it must be remembered that ASC records do not include livestock ranches or farms on which no wheat is produced. Furthermore, ASC farm units are not necessarily operating units. An operating unit may consist of several farm units with different ownerships. ASC records showed a total of 2,336 farm units in 1959 but further investigation revealed that there were only 1,871 operating units. The 20% reduction in so-called farm units reflects such things as the combining of farm units in the hands of part-owners or tenants, the operation of units on a custom basis, and joint operation of two or more farm units by father and son, by brothers, or by other partnerships. The greatest differences between Census and ASC records were found in Wasco and Umatilla counties, where a relatively large number of diversified or part-time farms are reported and where the growing of spring wheat is of some importance.

More important than a comparison in number of farms, as far as completeness of ASC records is concerned, is a comparison of the total acreage of cropland.

In spite of the fact that the cropland as shown by the Census is the total for all farms in the county, while ASC records include only cropland on farms on which wheat is produced, in three of the counties ASC cropland is larger than that reported by the Census. This can only be explained by a difference in definition of cropland as used by these two sources and greater completeness of ASC records.

Unfortunately, ASC records give no information on types and sizes of enterprises other than wheat. Obviously, on a significant number of farms wheat production is a minor enterprise compared with other field crops, fruits, vegetables, and livestock. Furthermore, some wheat farms are operated as a sideline by business or professional people. Others are too small to serve as the only source of income, forcing the operator to seek other employment to provide the means for family living. Comparison of wheat acreages with acreages of available cropland and of noncropland gives some clue as to the possibility of other than wheat enterprises existing on given farms, and to the probable size of such enterprises. For example, a small acreage of wheat which constitutes only a low percentage of total cropland available on a farm raises a question as to the significance of the wheat enterprise in the total farm organization and as a source of family income.

To clarify this situation, ASC county and community committee members were interviewed. Over the years they have become acquainted with all the operators in their districts, and through compliance checks know some of the details of organization and operation of the farm units. On the basis of these interviews, farm units were classified into four major groups; namely, specialized wheat-summerfallow farms; wheat-summerfallow farms with significant livestock enterprises; farms on which annual cropping is practiced, including irrigated farms

Table 1. Comparison of Number of Farms and Acreage of Cropland by Individual Counties

(Sources: Census of Agriculture, 1959 *prelim.*, and ASC records, 1959)

County	Census		ASC		Total cropland	
	All farms	Farms reporting winter wheat harvested ¹	Farm units	Operating units	Census	ASC
	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Acres</i>	<i>Acres</i>
Wasco	669	277	496	435	275,610	213,630
Sherman	247	228	404	238	299,882	298,805
Gilliam	196	157	236	170	279,226	286,339
Morrow	386	225	270	241	378,347	368,965
Umatilla	1,741	601	930	787	659,035	661,796
WHEAT AREA	3,239	1,488	2,336	1,871	1,892,100	1,829,535

¹ A small acreage of spring wheat is produced in Wasco and Umatilla counties, but the addition of farms reporting spring wheat harvested would have resulted in duplication of farms on which both spring and winter wheat were harvested.

and fruit farms; and miscellaneous other farms. The latter group, while large in number of units (19% of the total), accounts for only 3% of the total cropland reported. Included are units on which field work is hired from several individuals, units that are idle or in the Soil Bank, units that are part of other than wheat farms or a nonfarm business, units for which headquarters farms are located outside the wheat area, units that are operated by Indians on a reservation, and part-time units.

Because of the emphasis being given here to specialized wheat-summerfallow farms, this group was further broken down by tenure into farms operated by owners, part-owners, and tenants. Farms operated for a family estate by one of the beneficiaries were considered owner-operated farms. Three farms in the area were operated by managers. They were classified as owner-operated except in the analysis of farm tenure from which they were excluded. Because, in Table 2, custom-operated units are combined with those of the operators, and owned or rented units are combined with the headquarters farms of the owners, part-owners or tenants, and because some farms cross county lines, total acreages by counties differ slightly from those shown in Table 1. The data in Table 2 are used as the basis for further discussions of types and sizes of wheat farm operations in the area. In compiling the data presented in Table 2, farms operated on a custom basis by wheat farmers in the area were included in the farms of the custom operator. This was done because the operation of a relatively small unit becomes a part of the operation of the custom operator whose equipment is adequate to perform the required work. In cases where payment for custom work is made after harvest, the arrangement actually differs little from a rental basis of operation.

The wheat history shown in Table 2, also referred to as the average base acreage for wheat, is the wheat allotment acreage plus the diverted acreage; that is, the base from which the allotment was calculated. On wheat-summerfallow farms with little or no livestock the average

base acreage is close to 50% of the cropland. In Wasco and Umatilla counties it is slightly lower than in the centrally located counties because of greater diversification on irrigated and nonirrigated farms.

Wheat history has been chosen here as being more meaningful than wheat allotment because many farmers overplant their original allotment in order to be sure of the full acreage allowed for harvest under the program, and cut the excess for hay before the final date for compliance. This provides some hay for the few head of cattle kept on available noncropland and stubble pasture. The acreage used for barley, therefore, is usually smaller than the available cropland acreage minus the wheat allotment. Furthermore, wheat history or base acreage can readily be used for the calculation of expected wheat acreage under any allotment program. In the absence of any acreage restrictions it approaches the acreage available for wheat except as this may be changed by varying price relationships for farms having alternative opportunities.

There are basic differences between organizational changes made by farmers in response to normal economic forces and changes made under the allotment program. Under the latter, there is a strong incentive to preserve the wheat history, partly because of frequent changes in programs and partly because wheat is the best adapted and most profitable crop that can be grown. Normal adjustments in land use, on the other hand, are free to reflect long-time evaluations of economic conditions. For example, marginal land for wheat in the area as a whole generally would be diverted to other uses and uneconomically small units would be sold or leased to operators of larger units. Under an allotment program, land must be diverted to other uses regardless of the advantage of using it for wheat or its suitability for other uses. The percentage reduction in wheat acreage is the same for all farms, regardless of size of farm, productivity of soil, or existence of alternative opportunities for the diverted

Table 2. Number of Operating Units and Major Types of Land in Farms Producing Wheat, 1959

(Source: County ASC Records, 1959)

County	Operating units	Land in operating units	Cropland in operating units ¹	Wheat history 1954-59 ²	
				Total	Part of cropland
	<i>Number</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Percent</i>
Wasco	435	601,454	215,191	101,469	47.2
Sherman	238	452,117	306,371	150,130	49.0
Gilliam	170	572,173	280,941	136,437	48.6
Morrow	241	691,212	367,148	179,719	49.0
Umatilla	787	899,197	659,884	304,574	46.2
WHEAT AREA	1,871	3,216,153	1,829,535	872,329	47.7

¹ Differs from acreages shown on Table 1 because of method of handling operations across county lines. See text above.

² Average base acreage for wheat, or wheat allotment acreage plus acreage diverted from wheat.

acreage. The only feasible choice farmers have is to retain the best land in wheat on each operating unit and divert to barley or other alternatives that land which is less suitable from the standpoint of location, operating costs, and yields. Generally speaking, the less desirable

land for wheat production on each farm has been diverted from wheat production. This contributes to the increase in the average yield of wheat and the relatively low yields of barley which have been realized since the initiation of the allotment program.

Wheat Farms by Type, Size, and Tenure

The classification of wheat farms into the four major groups mentioned above permits a closer examination of certain characteristics of farms having wheat allotments. Farmers specializing in wheat production and operating on a wheat-summerfallow basis have different operating costs and adjustment problems than wheat farmers with a substantial livestock enterprise, those producing a crop every year, and those receiving only a small percentage of their income from wheat production.

The relative importance of major groups of farms is shown in Figure 3 by a comparison of number of farms, total land area, cropland, and wheat acreage. The predominance of specialized wheat-summerfallow farms is readily recognized. While these farms account for less than one-half of all farms producing wheat, they constitute by far the most important group in land area and wheat production. Next in importance in land area and wheat production are wheat-summerfallow farms that have a range livestock enterprise. On some of these farms the return from cattle may exceed the return from wheat. On a few farms small acreages of suitable land are being irrigated for forage production, but the large acreage of noncropland used for grazing is more important. Farms in the higher rainfall areas with annual cropping, when grouped with irrigated farms and orchards on which a smaller amount of land is used for wheat, are more numerous than any except the specialized wheat-summerfallow farms, but account for less than 10% of the land in farms, cropland, and wheat acreage. Miscellaneous other farms are unimportant in overall land use and in wheat production, although they constitute nearly 19% of all farms producing wheat in the area.

The significance of wheat to each group of farms is further illustrated in Figure 4. Wheat-summerfallow farms with important range livestock enterprises average largest in overall size, but only about 30% of their land is classified as cropland and the wheat acreage is only 45% of cropland. This leaves about 10% of the cropland, or about 90 acres per farm, available for other uses. Most of this 10% is probably devoted to forage production. On the specialized wheat-summerfallow farms, total land area is smaller but cropland constitutes 73% of all land and the wheat acreage is 49% of total cropland. The group of annual cropping, irrigated, and fruit farms is small in overall size but an average of 81% of the land in these farms is cropped. Wheat acreage averages 44% of available cropland. It is much lower on irrigated and fruit farms, and relatively high on farms on which annual cropping with grains or peas is practiced. Little can be said of the group of miscellaneous other farms except

that they are unimportant in a study of wheat farming. The variety of different farm units included in this group makes other generalizations difficult.

Operating units were at first classified into 16 groups, on the basis of acreage of cropland per farm, but the number of size groups was later reduced to 4; namely, small, medium, medium-large, and large farms. The distribution of farms and the average wheat history for major types of farms classified by size of cropland per farm is illustrated in Figure 5. Except for unusually large operations ranging from 5 to 15 or more sections of cropland, the largest average wheat acreage is found on specialized wheat-summerfallow farms within a size range of about one and one-half to three sections of cropland.

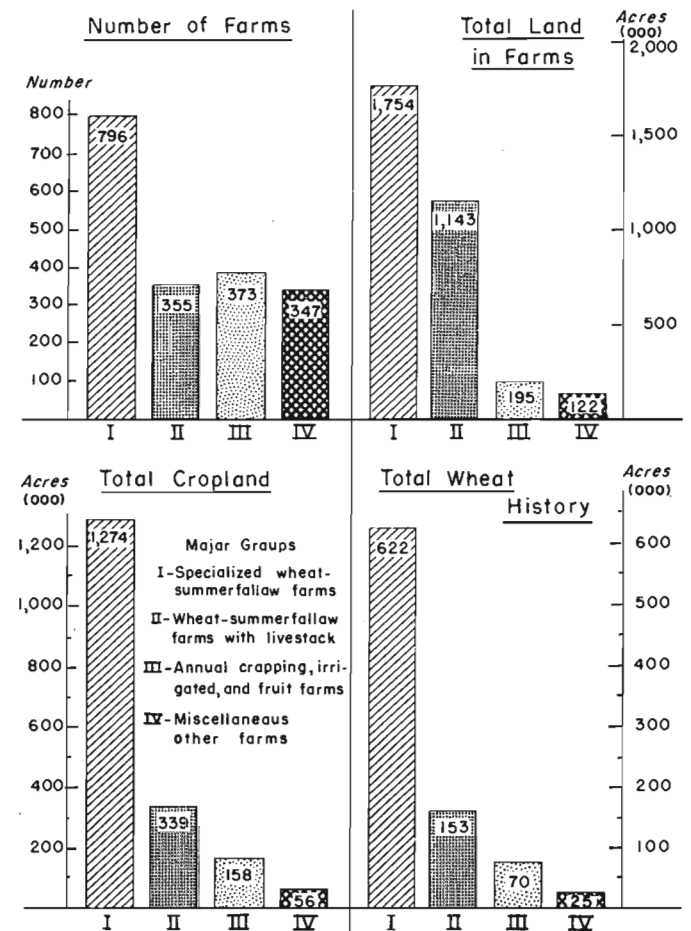


FIGURE 3. Comparison of number of farms and total land area by major groups of farms.

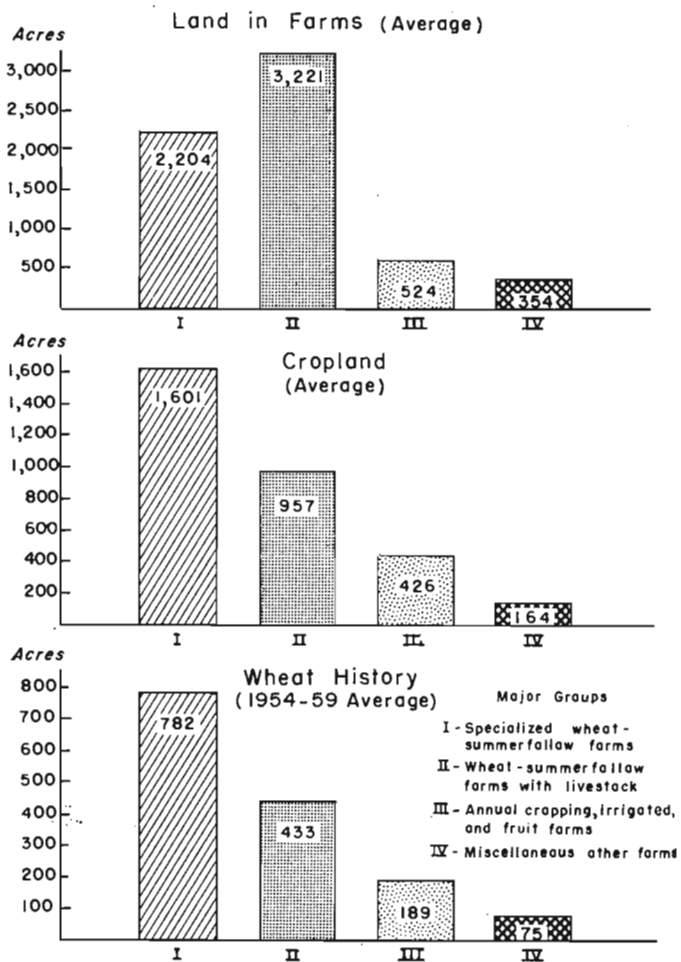


FIGURE 4. Comparison of average size of farm, average acreage of cropland, and average wheat history by major groups of wheat farms.

On wheat-summerfallow farms having livestock enterprises wheat acreage is more evenly distributed among the different size groups, although farms with relatively small acreages of cropland are more numerous. Annual cropping, irrigated, and fruit farms are concentrated in the small and medium groups, but a few in eastern Umatilla County reach considerable size and are important in wheat production. Miscellaneous other farms for the most part do not exceed one section of cropland and as far as wheat production is concerned are of little consequence.

In the absence of acreage allotments, 50% of the available cropland on a strictly specialized wheat-summerfallow farm would be planted to wheat each year. Different sizes of fields and the cropping of different parts of the farm in alternate years causes some year-to-year variation in wheat acreage, but the average remains close to one-half of the cropland. If some land is irrigated from bordering streams or underground water sources, as is the case on some wheat farms with livestock enterprises, wheat occupies somewhat less than 50% of the cropland.

The addition of a livestock enterprise, however, does not usually change the method of operation of the remaining cropland unless the farm is in the higher rainfall area.

In areas of higher precipitation, annual cropping can be practiced and the choice of crops that can successfully be grown is generally greater. Furthermore, rotation of crops often results in less than 45% of the cropland being used for wheat. This is particularly true for medium and small farms. However, the profitability of wheat production coupled with a desire to maintain as high a wheat history as possible has reduced year-to-year variation from the maximum acreage permitted under the allotment program.

The distribution of farms and average wheat acreage by groups of farms and by percentage of cropland used for wheat is illustrated in Figure 6. The largest acreage of wheat is concentrated on farms with wheat grown on 46 to 55% of available cropland. For a few operating units that are on the fringe of the higher rainfall area, or that consist of several parts of which one is located in the annual cropping area, the average base acreage exceeds one-half of the available cropland. Only in isolated cases will wheat acreage exceed 55% of cropland. For all types of farms, the largest number is found in the group with 46 to 55% of available cropland in wheat. Farms with a lower or higher percentage of wheat have a smaller total acreage of wheat. This is particularly true of farms practicing annual cropping. The average acreage of wheat on farms with less than 45% of the cropland used for wheat is only about one-tenth of the average acreage on those with 46 to 55% of the cropland in wheat.

In the absence of acreage restrictions and with favorable price relationships for wheat, specialized wheat-summerfallow farms can produce wheat on 50% of the cropland, and even exceed this in years of favorable moisture conditions. Farms operating on an annual cropping basis can devote a higher percentage of cropland to wheat than in the past. On the latter farms, price relationship will be the major factor in the use of cropland.

A third classification, by tenure of operator, was made for the two predominant groups of farms; namely, the specialized wheat-summerfallow farms and the wheat-summerfallow farms with significant livestock enterprises. The results of this classification by type of farm and major size group are illustrated in Figure 7. For both types of farms, number of units and acreage of cropland operated by full owners declines markedly as size of farm increases, while part-ownership becomes more important. Tenant farmers, on the other hand, are most numerous in the group of specialized wheat-summerfallow farms of medium size, but decline with further increases in size of farm. Of the wheat-summerfallow farms with livestock enterprises, tenants primarily operate small units; none operate large units. The number of owner-operated farms of this type declines more sharply with increase in size than is true for the specialized wheat farms. In the medium-large and large groups, the number of farms and the acreage of cropland operated by part-owners are actually greater than for full owners.

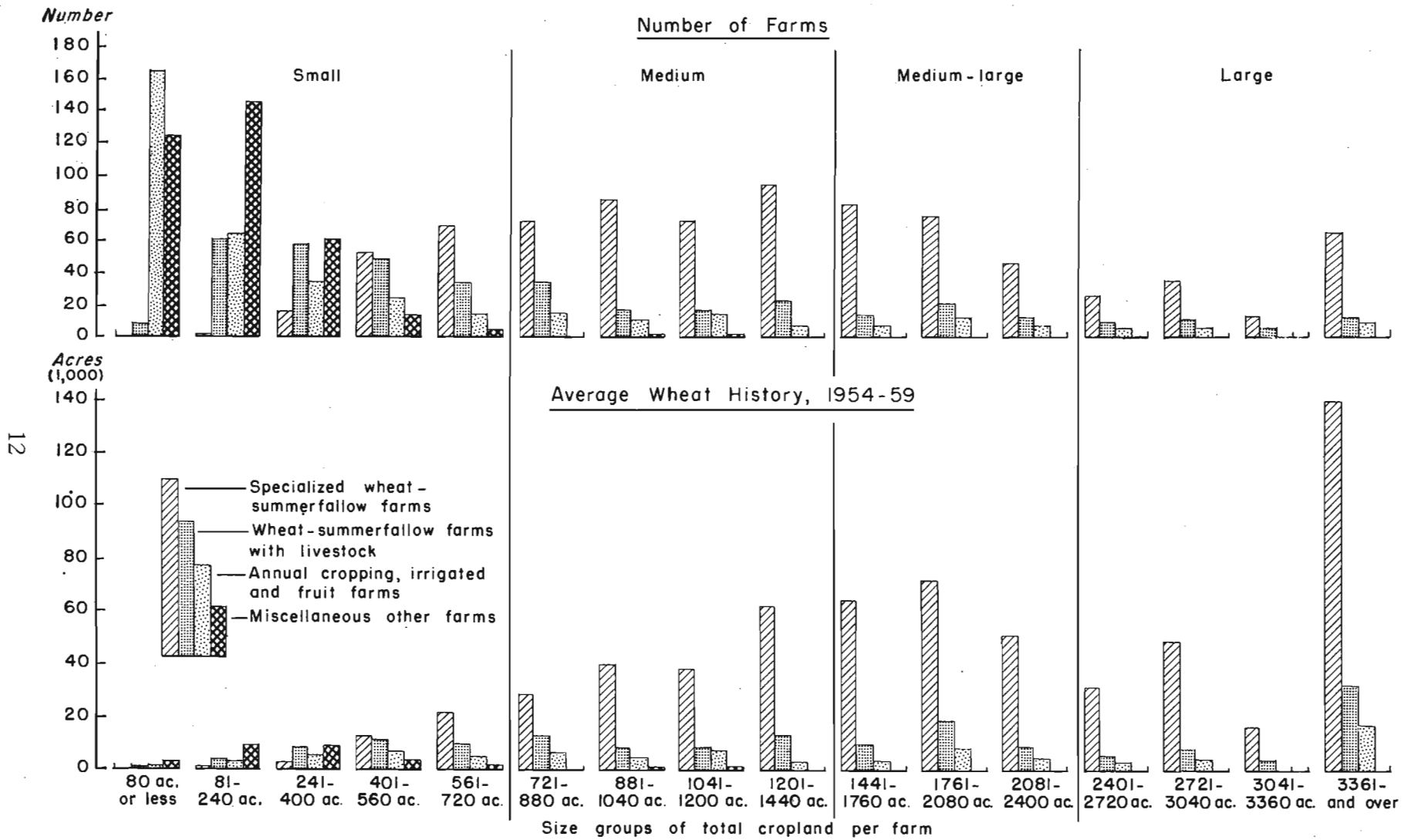


FIGURE 5. Number of farms producing wheat and average wheat acreage history, by major types of farms and size groups based on cropland acreage.

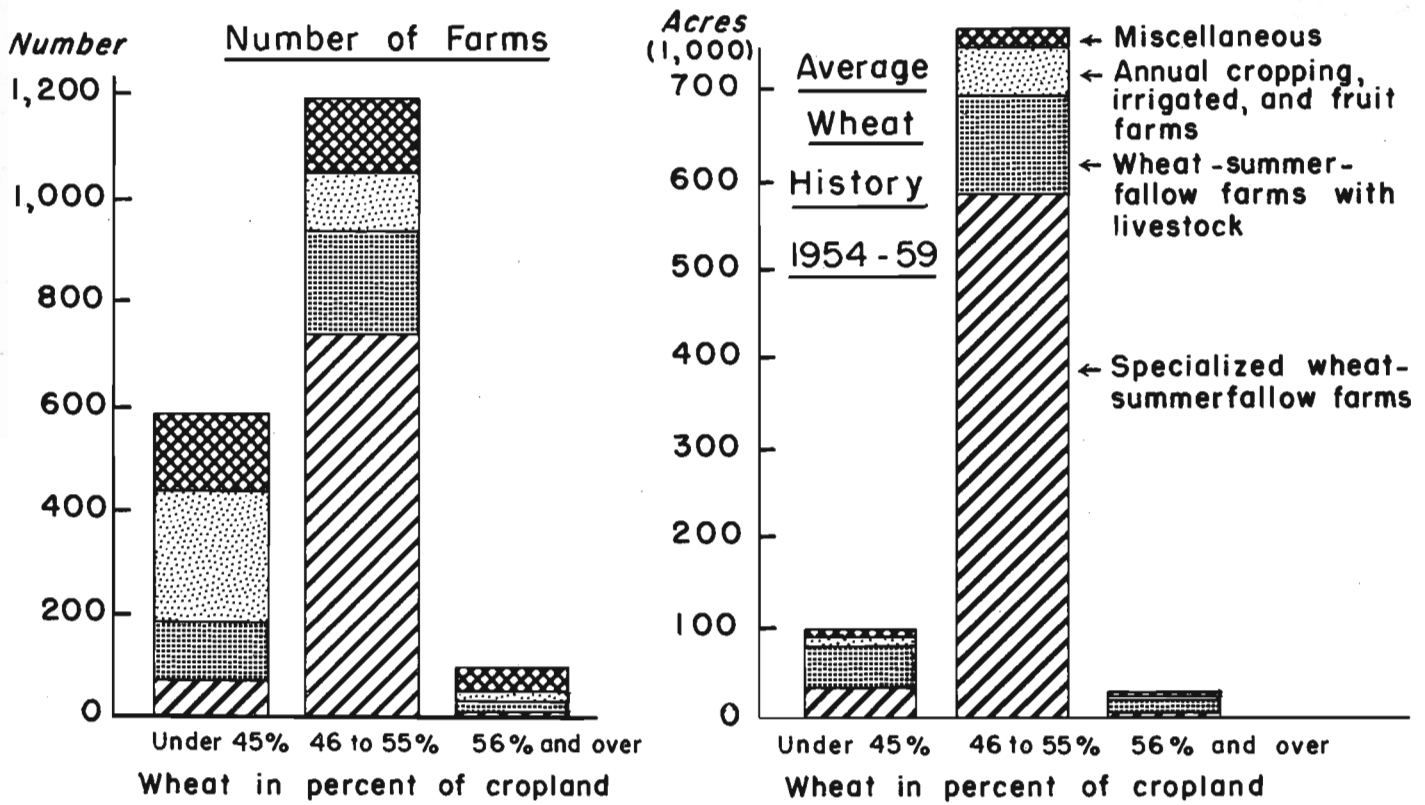


FIGURE 6. Number of farms and average wheat history by major groups of farms and percentage of cropland used for wheat.

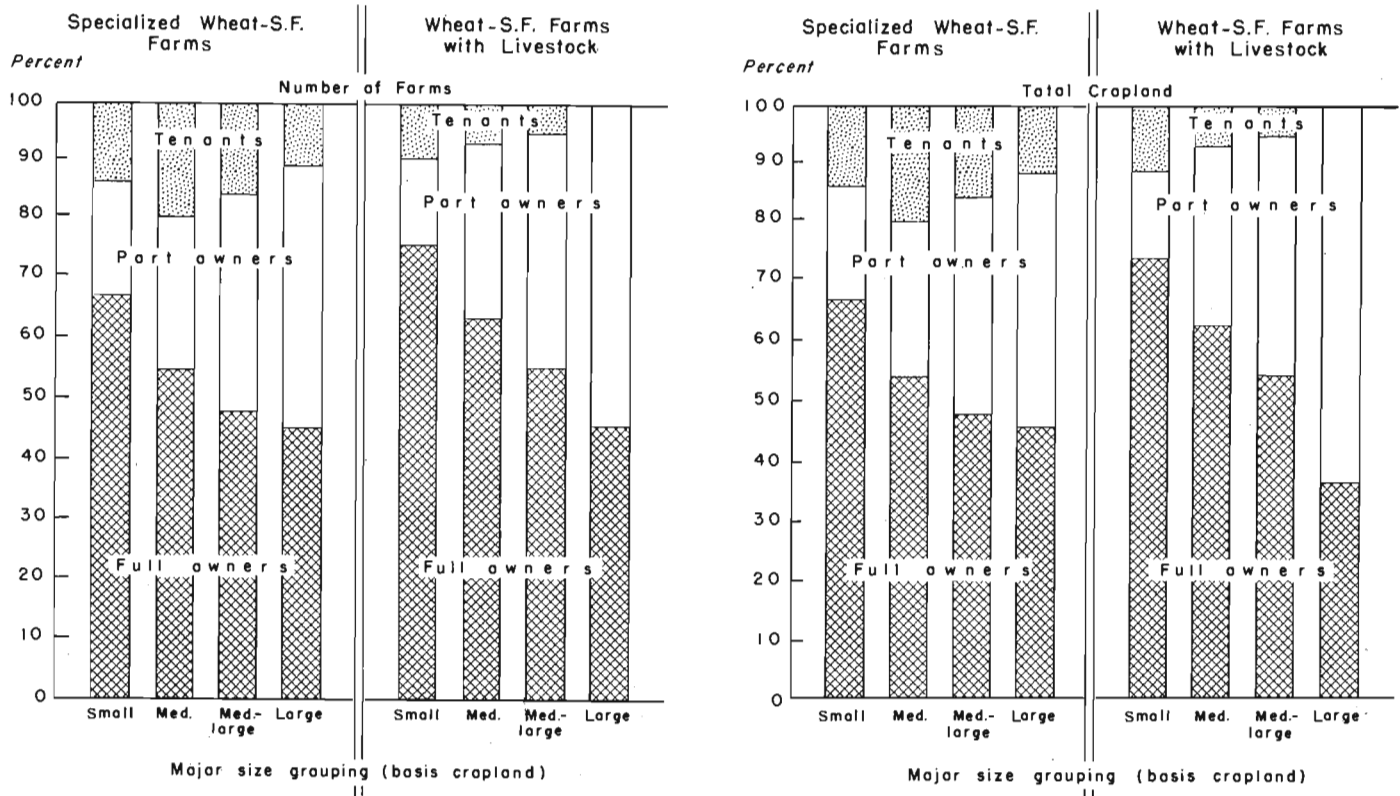


FIGURE 7. Percentage distribution of number of farms and total cropland by tenancy for major types and sizes of wheat farms.

Productivity Levels on Wheat Farms

The Columbia Basin accounted for slightly over two-thirds of the harvested acreage of wheat in Oregon during the 5-year period, 1954 to 1958. This was a decline from the 5-year period, 1939 to 1943, when 70% of the harvested wheat acreage in the state was in the Columbia Basin. There was a similar decline in the percentage of the state's total wheat production originating in the Columbia Basin. This trend in acreage and production is due in part to the effect of acreage allotment and price support programs and in part to greater yield increases outside the Columbia Basin than have been achieved in the five counties. Favorable prices also have made it possible to place greater emphasis on wheat in the rotation of crops on irrigated land, and this has been a factor in higher yields in the remainder of the state than in the Columbia Basin.

Differences in yields of winter wheat (about 95% of the wheat grown in the Columbia Basin) between the five counties and the remainder of Oregon were minor over the past 21 years. But spring wheat yields outside of the Columbia Basin showed a substantially greater increase

during this period than in the Columbia Basin. Yield comparisons between the wheat area and the remainder of the state are shown in Figure 8 by plotting 5-year moving averages at the midpoint to smooth out some of the year-to-year variations.

Both spring and winter wheat yields reflect the unfavorable weather during the 1940's and the more favorable weather during the recent 10-year period, accompanied by greater use of fertilizers and technological improvements. While over a long period weather may not be as favorable as during recent years, average yields for the period 1954 to 1958 reached levels which may well be maintained over an extended period in the future. In 1957, 1958, and 1959, yields of winter wheat in the Columbia Basin averaged 36.8, 35.5, and 36.2 bushels, respectively; the weighted average for the 5-year period ending in 1959 was 32.9 bushels. There is little doubt that the use of the best land for wheat under the acreage allotment program has influenced average yield during this period. However, the prospect of more widespread use of improved practices is believed to justify a somewhat conservative estimate of expected long-time yields of winter wheat in the Columbia Basin of 32 bushels per acre.

Spring wheat will continue to be grown primarily in years of unfavorable weather for fall planting or of heavy frost damage to winter wheat. The hazard of frost damage has been reduced considerably, however, by improved practices such as trashy fallow and deep-furrow seeding in the fall. Yields of spring wheat in the Columbia Basin are expected to remain from three to four bushels per acre below those of winter wheat. While fertilization and other practices used for winter wheat production will benefit spring-sown wheat to some extent, results are disappointing to most farmers in the area.

In the course of the administration of the Soil Bank Program, the Agricultural Stabilization Service has established productivity indexes for nearly all farms on which wheat is grown in the Columbia Basin. In addition, a so-called "normal" yield by counties is established each year on the basis of the 10-year average yield immediately preceding, with some minor adjustments. "Normal" yield established for 1959 for all wheat grown on summer-fallowed land was 28.8 bushels for Wasco County, 32.1 bushels for Sherman County, 26.9 bushels for Gilliam County, 26.5 bushels for Morrow County, and 30.7 bushels for Umatilla County. At these yield levels the 1959 acreage allotment for the five counties would have produced nearly 16.4 million bushels of wheat as compared with a reported production of nearly 20.0 million bushels. Average 1954 to 1958 production for the area was 17.3 million bushels. The weighted average yield for the area as a whole, using 1959 allotments and normal yield on land summerfallowed, is 29.2 bushels. This compares with an average yield of all wheat reported for the area of 32.9 bushels for the period 1955 to 1959. Thus, due to the rising yield trend and the method of

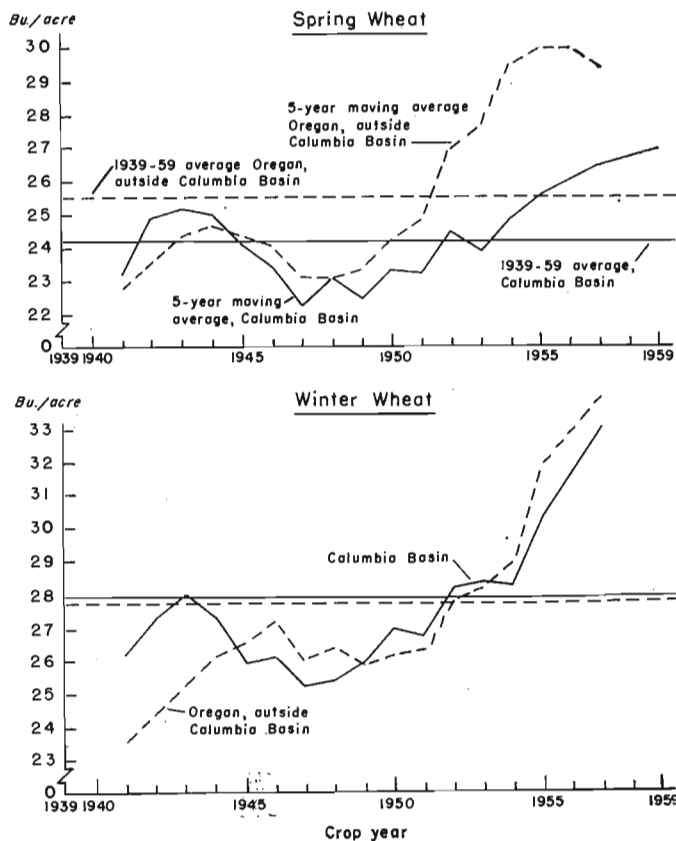


FIGURE 8. Yields of spring and winter wheat, Columbia Basin and Oregon outside the Columbia Basin, 1939-59.

(Source: Oregon Crop and Livestock Reporting Service.)

computation, normal yields have not as yet reached the higher level which is likely to be maintained over a long period of years.

An expected average yield of 32 bushels of wheat per acre for the Columbia Basin would be nearly 3% below the 1955-59, 5-year average. This 32-bushel level for the entire area is used here in an analysis of yield differentials by counties, and by types and sizes of farms.

On the assumption that normal yields established for the various counties reflect comparable productivity and that the index for each operating unit is a satisfactory indicator of the productivity on each unit, differentials by counties and by types and sizes of farms can be computed from available data. The location of any group of farms is the most important factor in its yield level. In other words, high or low yields are not necessarily associated with any type or size of farm except insofar as there may be a tendency for some types or sizes to be concentrated in certain areas. For example, during a period of generally increasing sizes of farms, small farms may be found in larger numbers in high producing areas, because the pressure for increasing size of operation to maintain satisfactory incomes has not been as great as in low producing areas. Conversely, in times of decreasing net returns farmers in low producing areas have been under greater pressure to adopt modern technology and to enlarge their operations than have those in the high producing areas.

On the basis of a weighted average yield of 32 bushels of wheat for the Columbia Basin, yields are shown in Table 3 by counties and by types of farms. The weight given to each yield figure is indicated by the percentage of cropland for the area. In each county except Morrow, a somewhat higher yield is indicated for specialized wheat-summerfallow farms than for wheat farms with sub-

stantial livestock enterprises. Thus, farms having livestock enterprises appear to be located in areas where large amounts of rangeland not suitable for cultivation are available and the adjacent cropland is of somewhat lower productivity than in areas in which specialized wheat farms are found. Annual cropping farms tend to be concentrated in the higher rainfall areas and have a comparatively high productivity level. Many of these farms are in Umatilla County, with only 3% of the total cropland showing a yield below the county average.

Analysis of wheat yields by size of farm for the specialized wheat farms (upper portion, Table 4) indicates a decline in yield as the size of farm increases, except in Sherman County, which shows a consistent increase in yield as size of farm increases. The same is true for wheat farms with livestock in Sherman County (lower portion, Table 4). In most of the counties, medium and medium-large wheat-livestock farms have somewhat higher yields than other size groups, but there appears to be no consistent trend and yield variations are less pronounced.

The productivity level on wheat farms, as discussed above, is measured by the yield of wheat, the most important single crop in the Columbia Basin. Since initiation of the allotment program, however, barley has become important as the most common alternative to wheat on the diverted acreage.

Because of unfavorable price relationships, barley acreage harvested in the Columbia Basin declined during the four years immediately preceding the allotment program from 67,000 acres in 1950 to less than 15,000 in 1953. The allotment program caused an increase in the harvested acreage of barley to an average of over one-fourth million (257,500) acres for the 5-year period, 1955 to 1959. Production of barley increased from an

Table 3. Percentage of Cropland and Expected Average Yields of Wheat¹ by County and Type of Farm
(Source: ASC Records, 1959)

County	Specialized wheat-s.f. farms		Wheat-s.f. farms with livestock		Annual cropping irrigated and fruit farms		Miscellaneous other farms		All farms	
	Cropland in area	Expected yield per acre	Cropland in area	Expected yield per acre	Cropland in area	Expected yield per acre	Cropland in area	Expected yield per acre	Cropland in area	Expected yield per acre
	Percent	Bushels	Percent	Bushels	Percent	Bushels	Percent	Bushels	Percent	Bushels
Wasco	4.7	33.3	5.5	30.5	.1	29.8	1.4	24.9	11.7	31.0
Sherman	14.9	36.1	1.5	30.4	.....	.....	.3	34.5	16.7	35.6
Gilliam	13.4	30.1	1.8	29.1	.....	.....	.2	28.1	15.4	30.0
Morrow	18.0	27.3	1.8	28.5	²	27.4	.3	24.6	20.1	27.4
Umatilla	18.6	33.8	8.0	29.9	8.5	39.0	.9	33.1	36.1	34.2
WHEAT AREA	69.6	31.7	18.6	29.9	8.7	38.8	3.1	28.5	100.0	32.0

¹ To compute expected yields by counties, types, and sizes of farms, the average normal yield 1956 to 1959 for the county was multiplied by the productivity index for each farm which in turn was multiplied by the average wheat history of each unit. Resulting weighted average yields by counties, types, and sizes of farms were raised to a level of 32 bushels of wheat per acre for the Columbia Basin as a whole.

² Less than one-tenth of one percent.

Table 4. Percentage of Cropland and Expected Average Yield of Wheat¹ by County and Size of Farms of Major Types

(Source: ASC Records, 1959)

County	Small		Medium		Med.-large		Large		All farms	
	Cropland in area	Expected yield per acre	Cropland in area	Expected yield per acre	Cropland in area	Expected yield per acre	Cropland in area	Expected yield per acre	Cropland in area	Expected yield per acre
	Percent	Bushels	Percent	Bushels	Percent	Bushels	Percent	Bushels	Percent	Bushels
<i>Specialized wheat-summer-fallow farms</i>										
Wasco	1.4	33.9	3.1	33.2	1.7	33.4	0.5	32.2	6.7	33.3
Sherman	1.1	35.0	7.9	35.6	6.8	36.2	5.7	36.9	21.5	36.1
Gilliam	0.7	30.6	3.8	30.7	4.6	30.7	10.1	29.7	19.3	30.1
Morrow	0.8	29.8	5.1	28.3	7.8	27.5	12.1	26.6	25.8	27.3
Umatilla.....	1.9	36.5	7.1	35.0	8.5	33.7	9.3	32.5	26.7	33.8
WHEAT AREA	5.9	33.9	27.0	33.1	29.4	32.2	37.7	30.5	100.0	31.7
<i>Wheat-summer-fallow farms with livestock</i>										
Wasco	9.2	30.7	12.0	30.7	4.4	31.4	4.3	29.1	29.9	30.5
Sherman	2.2	28.8	1.9	29.0	4.0	31.9	.....	.....	8.1	30.4
Gilliam	1.4	27.5	2.2	28.5	1.2	27.6	4.5	30.4	9.3	29.1
Morrow	3.2	29.4	4.0	30.4	0.6	24.4	1.9	24.4	9.6	28.5
Umatilla	5.4	28.6	6.5	32.4	11.5	31.5	19.7	28.4	43.1	29.9
WHEAT AREA	21.4	29.6	26.6	30.7	21.6	31.1	30.4	28.5	100.0	29.9

¹ For computation of expected yields see footnote 1, Table 3.

Table 5. Comparison of Acreage Harvested and Weighted Average Yield of Barley and Wheat by Counties, Five-year Average 1955-59

(Source: Oregon Crop and Livestock Reporting Service)

County	All barley		All wheat	
	Acreage harvested	Weighted average yield per acre	Acreage harvested	Weighted average yield per acre
	<i>Acres</i>	<i>Bushels</i>	<i>Acres</i>	<i>Bushels</i>
Wasco	22,900	30.0	59,320	31.6
Sherman	43,100	32.7	89,600	35.0
Gilliam	45,600	31.4	86,900	29.7
Morrow	62,400	27.9	110,100	29.0
Umatilla	83,500	36.4	201,300	35.2
WHEAT AREA	257,500	32.3	547,220	32.6

average of nearly one million (956,000) bushels for the period 1950 to 1953 to over 8.3 million bushels during the period 1955 to 1959.

Before the allotment program, barley yields generally exceeded yields of wheat by a few bushels, because only the best suited land was used for barley. Since the beginning of the allotment program, barley yields, while showing some increase over the earlier period, have not increased as much as yields of wheat. Less suitable land is devoted to the production of barley, and farmers gen-

erally do not apply the same improved practices to barley as are used for wheat. Therefore, the average yield of barley as shown in Table 5 for the most recent 5-year period is slightly below the yield of wheat. In Gilliam and Umatilla counties, barley yields are somewhat above wheat yields during the 5-year period, 1954 to 1958, but in all other counties they were below wheat yields on a bushel basis. Converted to pounds of grain, wheat on the average for the area has been yielding about one-fourth more than barley over the past five years.¹

Conclusions

The foregoing discussions point out a number of major characteristics of the Oregon wheat area that are important in subsequent analysis of costs and returns from wheat farming. These characteristics also are useful for studying possible adjustments to changing economic conditions or program proposals to alleviate the wheat surplus situation.

Cash grain farming with or without range livestock remains the major type of agriculture in the wheat area. Barley production has become important only since initiation of the acreage allotment program, as an alternative crop on land diverted from wheat. The gradual increase in livestock production has been accomplished by better use of land resources not suited for grain crops rather than by diversion of land from wheat.

Wheat farms are generally large in size both in terms of acreage operated and volume of sales of farm products. Combination wheat-livestock farms on the average are largest in overall size but have less cropland per farm than specialized wheat farms with unimportant livestock enterprises. The latter include nearly three-fourths of the total cropland available in the wheat area.

Full ownership over the area as a whole is most common on specialized wheat farms, particularly on small and medium-size ones. Part-ownership increases rapidly as the size of operation increases, especially on wheat farms having an important livestock enterprise. The number of tenants is significant only on specialized wheat farms without major livestock enterprises. It is largest on medium-size farms and decreases as the size of operation increases.

Most wheat farms operate on an alternate crop-fallow

basis. Only in the higher rainfall belt is annual cropping with wheat, peas, other grains, and a few forage crops possible. The cropland so used is less than 10% of the total cultivated land. Fall seeding of grains is generally preferred because it results in higher yields, lower erosion damage during the winter, and lower costs. Spring seeding is necessary in case of adverse weather in the fall or excessive frost damage, experienced mainly in barley production.

New technology in farming, mainly improved practices, weed control, fertilization, and better varieties have contributed greatly to rapidly rising yields. While the upward trend began about 1945, it is especially noticeable since initiation of the acreage allotment program. In the face of rising costs without substantial price increases for wheat and barley, this program has permitted some wheat farmers, who were able to enlarge the size of their operations, to maintain a satisfactory income.

The level of yields on specialized wheat farms is somewhat higher than on wheat farms with significant livestock enterprises. Differences, however, are caused by the location of farms and the productivity of existing land resources rather than the type or size of operation.

¹The above discussion of the level of barley yields is based on reports of the Oregon Crop and Livestock Reporting Service and applies to the area as a whole. Varietal tests made on field plots at the Sherman Branch Experiment Station for the period 1957 to 1958 indicate that the most common winter varieties of barley yielded only slightly fewer pounds per acre than winter wheat varieties. Spring barley varieties were the highest yielding cereal exceeding both wheat and winter barley. Greater uniformity in soil and in production practices seems to result in more favorable yields of barley compared with wheat.

Appendix Tables

Appendix Table 1. Land in Farms by Type of Use, Columbia Basin Wheat Area of Oregon

(Source: U. S. Census of Agriculture, 1959, prelim.)

Item	State	Wheat area		County as percentage of wheat area				
		Total	Part of state	Wasco	Sherman	Gilliam	Morrow	Umatilla
	<i>Acres</i>	<i>Acres</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Approximate land area....	61,578,240	6,208,360	10.1	24.6	8.5	12.5	21.2	33.2
<i>Land in farms by use</i>								
Total all land	21,583,784	5,273,754	24.4	26.0	9.9	14.7	21.0	28.4
Cropland	5,477,203	1,892,100	34.7	14.6	15.8	14.8	20.0	34.8
Land pastured	15,904,312	3,351,715	21.1	32.6	6.6	14.8	21.5	24.5
Woodland	3,881,367	406,018	10.5	25.6	.3	12.8	24.4	36.9
Irrigated land	1,384,284	91,981	6.6	18.3	1.6	3.6	15.3	61.2
Land in orchards, vineyards, etc.	99,338	9,394	9.5	63.9	0.5	1.8	0.2	33.6
Total noncropland ¹	16,136,581	3,381,654	21.0	32.4	6.6	14.6	21.6	24.8
Cultiv. summerfallow	927,559	738,361	79.6	11.5	19.1	17.2	22.2	30.0

¹ Not reported separately. Data obtained by subtracting cropland from total land in farms.

Appendix Table 1A. Tenure of Farm Operator, and Major Types of Livestock, Columbia Basin Wheat Area of Oregon

(Source: U. S. Census of Agriculture, 1959, prelim.)

Item	State	Wheat area		County as percentage of wheat area				
		Total	Part of state	Wasco	Sherman	Gilliam	Morrow	Umatilla
	<i>Number</i>	<i>Number</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
<i>Tenure of farm operator</i>								
Full owners	31,360	1,765	5.6	24.7	3.0	4.3	10.0	58.0
Part owners	7,900	991	12.5	16.3	10.7	7.7	13.8	51.5
Managers	257	40	15.6	12.5	7.5	10.0	12.5	57.5
All tenants	3,056	452	14.8	15.0	18.8	8.9	15.3	42.0
<i>Livestock</i>								
Beef cows	469,033	65,871	14.0	22.8	8.2	12.1	21.5	35.4
Milk cows	152,226	5,579	3.7	15.4	2.9	4.8	14.4	62.5
Hogs born before June 1	70,155	9,578	13.7	33.5	6.8	4.3	12.9	42.5
Ewes	612,139	93,625	15.3	18.5	1.3	10.1	41.3	28.8

Appendix Table 2. Average Acreage of Major Land Uses, Quantity of Livestock Sold, and Value of Land and Buildings, Columbia Basin Wheat Area, Oregon

(Source: U. S. Census of Agriculture, 1959, prelim.)

Item	Unit	State	Wheat area					
			Total	Wasco	Sherman	Gilliam	Morrow	Umatilla
Proportion of land area in farms	Percent	35.1	84.9	89.9	98.6	99.7	84.2	72.7
Proportion of cropland of all land in farms	Percent	25.2	35.9	20.1	57.5	36.1	34.1	44.0
<i>Averages per farm reporting:</i>								
<i>Land</i>								
All land in farms	Acres	507	1,628	2,049	2,112	3,941	2,875	861
Cropland ¹	Acres	110	250	296	1,104	1,332	824	373
Land pastured ¹	Acres	362	1,050	1,313	882	2,257	1,569	634
Woodland ¹	Acres	205	1,005	704	253	1,442	2,410	1,078
Irrigated land	Acres	78	52	55	46	69	60	49
Land in orchards, vineyards, etc.	Acres	10	17	29	8	19	1	10
Noncropland ²	Acres	379	1,044	1,637	898	2,516	1,895	483
Cultivated summer-fallow	Acres	168	523	286	600	785	752	442
<i>Livestock and livestock product sales</i>								
Cattle and calves sold alive	Number	29	43	35	30	57	51	45
Milk and cream sold	Dollars	4,147	4,424	6,222	174	362	1,950	4,940
Hogs and pigs sold alive	Number	44	64	56	33	34	55	76
Sheep and lambs sold alive	Number	112	410	268	37	326	558	466
<i>Value of land and buildings</i>								
Per farm	Dollars	41,684	96,308	61,799	156,590	159,755	140,842	84,000
Per acre	Dollars	93.80	59.15	39.39	70.69	39.83	49.08	116.56

¹ Wherever possible preliminary data from the 1959 census are given. These data are from the 1954 census.

² Since the acreage of noncropland is not reported separately but has been obtained by subtraction of cropland from all land in farms, data given refer to the average for all farms.

Appendix Table 3. Classification of Farms, Residence, and Other Income of Farm Operator,
Columbia Basin Wheat Area of Oregon

(Source: U. S. Census of Agriculture, 1959, prelim.)

Item	State total	Wheat area		County as percentage of wheat area				
		Total	Part of state	Wasco	Sherman	Gilliam	Morrow	Umatilla
	<i>Number</i>	<i>Number</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
All farms	42,573	3,239	7.6	20.7	7.6	6.1	11.9	53.7
<i>Classification of farms:</i>								
<i>By major type</i>								
Cash-grain farms	2,522	1,098	43.5	19.2	18.4	12.6	15.7	34.1
Other field crop, veg. and fruit farms	4,394	317	7.2	47.0	.....	.....	7.9	45.1
Dairy and poultry farms	4,875	115	2.4	9.6	.....	.....	13.9	76.5
Other livestock farms	6,176	517	8.4	23.4	2.9	7.7	11.8	54.2
General farms	3,490	158	4.5	6.3	0.6	0.6	10.8	81.7
Misc. and unclassified farms	21,092	969	4.6	16.4	1.6	1.5	8.7	71.8
<i>By value of sales</i>								
\$40,000 or more	2,148	561	26.1	13.0	13.2	13.0	18.5	42.3
\$20,000 to \$39,999....	3,159	536	17.0	18.3	17.7	11.0	12.9	40.1
\$10,000 to \$19,999....	4,953	412	8.3	26.2	7.3	6.1	9.7	50.7
\$5,000 to \$9,999	5,508	346	6.3	39.6	4.9	0.9	9.0	45.6
Under \$5,000	7,027	384	5.5	23.7	0.5	5.2	12.5	58.1
All commercial farms	22,795	2,239	9.8	22.7	9.7	8.0	13.1	46.5
All other farms ¹	19,754	935	4.7	16.5	1.7	1.6	8.8	71.4
<i>Residence of farm operator</i>								
On farm operated....	38,143	2,723	7.1	20.3	7.8	5.6	12.2	54.1
Not on farm operated	2,501	384	15.2	25.3	6.2	9.1	11.2	48.2
<i>Off-farm work and other income</i>								
Other income of family exceeding value of farm products sold	21,622	1,066	4.9	19.6	0.8	1.2	6.8	71.6
Working off-farm more than 100 days	18,489	991	5.4	21.7	1.2	2.2	7.0	67.9

¹ Part-time, residential, and abnormal farms.

Appendix Table 4. Size of Operation, Land Use, Investment in Real Property, Livestock, and Income from Off-Farm Sources by Major Types of Farms, Columbia Basin Wheat Area of Oregon, 1954

(Source: U. S. Census of Agriculture, 1954)

Item	Unit	Cash-grain farms	Livestock farms (other than dairy or poultry)	General farms	Other classified farms	Misc. and unclassified farms	All farms
Number of farms	Number	1,326	485	195	640	985	3,631
Percentage by major type	Percent	37	13	5	18	27	100
Average size of farm	Acre	2,103	3,396	729	217	74	1,319
Cropland per farm ¹	Acre	1,187	221	192	106	22	525
Farms reporting summerfallow	Percent	89	26	22	10	5	40
Acreage of summer-fallow ¹	Acre	592	186	94	66	56	499
Farms reporting irrigable land	Percent	22	63	79	75	71	53
Acreage of irrigated land ¹	Acre	54	81	106	53	10	46
Farms reporting land pastured	Percent	81	95	95	62	63	75
Acreage pastured ¹	Acre	1,115	3,295	538	174	68	1,067
Value of land and buildings	Dollars	141,405	56,229	49,400	44,598	14,043	72,810
Farms reporting sales of cattle ¹	Percent	67	98	78	44	27	57
Cattle and calves sold ¹	Number	28	74	29	22	5	35
Farms reporting sales of hogs	Percent	12	20	24	12	7	12
Hogs and pigs sold ¹	Number	25	76	15	13	13	31
Operators reporting other income of family exceeding value of sales of farm products	Percent	7	15	16	15	81	30
Operators working off farm more than 100 days	Percent	7	15	22	20	61	26

¹ Per farm reporting.

Appendix Table 5. Size of Operation, Land Use, Investment in Real Property, Livestock, and Income from Off-Farm Sources by Value of Sales of Farm Products, Columbia Basin Wheat Area of Oregon, 1954

(Source: U. S. Census of Agriculture, 1954)

Item	Unit	\$25,000 and over	Commercial farms Value of sales			Non- commercial farms
			\$10,000 to \$24,999	\$2,500 to \$9,999	Under \$2,500	
Number of farms	Number	770	737	707	455	962
Percentage of all farms	Percent	21	20	19	13	27
Average size of farm	Acre	4,127	1,384	631	196	59
Cropland per farm ¹	Acre	1,680	521	126	67	21
Farms reporting summerfallow	Percent	87	66	32	8	5
Acreage of summerfallow ¹	Acre	820	313	120	41	38
Farms reporting irrigable land	Percent	24	42	69	58	71
Cattle and calves sold ¹	Acre	146	86	45	27	10
Farms reporting land pastured	Percent	81	82	81	73	64
Acreage pastured ¹	Acre	2,992	1,051	596	167	45
Value of land and buildings ¹	Dollars	206,078	81,631	34,038	13,051	13,165
Farms reporting sales of cattle.....	Percent	74	65	69	61	27
Cattle and calves sold ₁	Number	64	42	25	10	4
Farms reporting sales of hogs.....	Percent	13	13	17	13	7
Hogs and pigs sold ¹	Number	28	50	37	9	13
Operators reporting other income of family exceeding value of sales of farm products	Percent	1	4	21	22	82
Operators working off-farm more than 100 days	Percent	4	8	21	24	62

¹ Per farm reporting.

Appendix Table 6. Size of Operation, Land Use, Investment in Real Property, Livestock, and Income from Off-farm Sources by Tenure of Operator, Columbia Basin Wheat Area of Oregon, 1954

(Source: U. S. Census of Agriculture, 1954)

Item	Unit	Full owner	Part owner	All tenants
Number of farms	Number	1,234	922	470
Percentage of all farms	Percent	34	25	13
Average size of farm	Acre	890	2,973	1,549
Cropland per farm ¹	Acre	345	1,021	919
Farms reporting summerfallow	Percent	38	64	74
Acreage of summerfallow ¹	Acre	345	631	541
Farms reporting irrigable land	Percent	56	44	25
Acreage of irrigated land ¹	Acre	51	79	84
Farms reporting land pastured	Percent	77	83	79
Acreage pastured ¹	Acre	707	2,364	817
Value of land and buildings ¹	Dollars	49,437	143,611	124,129
Farms reporting sales of cattle	Percent	62	75	66
Cattle and calves sold ¹	Number	29	51	35
Farms reporting sales of hogs	Percent	14	16	13
Hogs and pigs sold ¹	Number	31	31	52
Operators reporting other income of family exceeding value of sales of farm products	Percent	16	4	10
Operators working off farm more than 100 days	Percent	17	5	15

¹ Per farm reporting.