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Wheat Production
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COMMERCIAL WHEAT PRODUCTION

- World Market
- U.S. Production Centers
- Costs and Returns Analysis

ECONOMIC RESEARCH SERVICE • U.S. DEPARTMENT OF AGRICULTURE



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ABSTRACT

A glut in the world wheat supply has caused several major exporting nations to adopt measures in supply control. Farm program restrictions on permitted wheat acres have influenced costs and returns to U.S. producers, particularly in the wheat specialty areas. Financial earnings of a program participant on a viable wheat farm are of considerable interest to formulators of farm policy and to U.S. legislators.

Appropriate financial returns were allocated to production resources other than the farm operator's labor and entrepreneurship. The latter inputs were then accorded the residual return from the farm business. A return to the ownership of land used in wheat production was also calculated. In the period 1967-69, average annual returns to operator's labor and entrepreneurship ranged from \$8,232 (Central Plains) to \$14,666 (Pacific Northwest). The net annual benefits of land ownership ranged from 2.2 to 9.1 percent of the market value of the land.

Keywords: Commercial wheat farms, production costs, financial returns, partitioning financial returns.

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The exceptionally good market for wheat during most of the 1960's resulted in a rapid expansion of wheat production in a number of countries. Among major U.S. competitors—Canada, Australia, and Argentina—this expansion was largely accomplished by increasing wheat acreage. By 1968, production in these countries increased 52 percent over the 1960-62 average.

In other countries such as Romania, Spain, Bulgaria, Mexico, Greece, and Sweden, production was increased by boosting yields. Wheat output in these countries increased by 46 percent between 1960/62 and 1967, while the acreage planted to wheat declined 3 percent.

One of the more remarkable breakthroughs in boosting yields occurred in India where dwarf wheats introduced from Mexico have increased yields sevenfold. The new wheats are also revolutionizing wheat farming in West Pakistan, Nepal, Afghanistan, Turkey, the Mediterranean countries of North Africa, Argentina, and in much of the rest of the wheat-raising world.¹

During 1968-69, several other countries showed marked increases in wheat production, and as a consequence some became net exporters. Iran exported 9 million bushels whereas several years ago it had been importing nearly 20 million bushels annually. New Zealand was also a net exporter of wheat during the 1968/69 season along with Finland, Denmark, Hungary, and Kenya. Total volume from such new exporters during 1968-69 probably did not exceed 15 million bushels; the main impact was to add to the already growing roster of exporting countries. Furthermore, because virtually all of these small exporters produce mainly medium-to-low protein wheats, their supplies aggravated the already weak and depressed world markets for such wheats.²

Efforts at Supply Control

For several decades, with only a few periods of respite, the major wheat-exporting nations have been saddled with burdensome surpluses, expensive to store, and exerting a downward pressure on domestic and world prices. The desired goal is to maintain production sufficient to satisfy all domestic needs, including reserves, and the effective demand for exports.

¹ From a special report of the Rockefeller Foundation "A Partnership to Improve Food Production in India."

² For a more complete picture of the world wheat supply situation at mid 1969-70 trading year, see "Competition for World Wheat Markets and U.S. Exports," U.S. Dept. Agr. FAS M 214.

Certain nations have undertaken deliberate moves to restrict production when world surpluses threaten or exist. In the United States, these efforts were directed to acreage reduction; Canada and Australia set up marketing quotas, limiting the amount of wheat that growers could market.

Guided by the Food and Agriculture Act of 1965, U.S. policy makers have tried to pursue a deliberate action of balancing production with anticipated domestic use and export. After very few restrictions on production in 1967, the 1968 national wheat allotment was reduced by 13 percent from the 68.2 million acre allotment of 1967. Nonetheless, production in 1968 actually exceeded that of 1967 by about 50 million bushels.

The national wheat allotment was reduced again in 1969 by an additional 13 percent. Also, as a condition for loan and certificate eligibility, an acreage equal to 15 percent of the allotment had to be diverted to a conserving use. Producers were permitted to further divert up to 50 percent of their farm allotments from wheat. Payments offered for this further diversion were 50 percent of county wheat loan rates multiplied by each farm's projected yield. Still, production in 1969 was only 7 percent below that of the previous year.

U.S. policy for 1968 and 1969 had been designed to balance production with anticipated domestic use and export, but it missed its mark by a considerable margin. The chief reason was that average yields kept climbing: 25.9 bushels per acre in 1967; 28.4 in 1968; 30.6 in 1969; and 31.1 in 1970. Carryover as of July 1 was: 425 million bushels in 1967; 539 million in 1968; 818 million in 1969; and 883 million in 1970.

Wheat allotments were again reduced for the 1970 crop to a national total of 45.5 million acres—about 12 percent less than 1969. In 1970, wheat production was down 6 percent from 1969. A further reduction to 43.5 million-acre national wheat allotment was announced for 1971.

In Canada, wheat yields also took a sharp upturn in 1969 over 1968 and added heavily to an already large stockpile in that country. Canada's July 31, 1970, carryover was equivalent to approximately 2 years' disappearance. Restricted by delivery quotas and aware of the dim outlook for exports, Canadian producers on their own initiative reduced wheat plantings by 5 million acres in 1969. However, no further large acreage reduction in 1970 was expected without some direct Government assistance. Rather drastic measures were needed to reduce Canada's stock position to a reasonable relation with normal sales volume.

Early in 1970, the Canadian Government proposed a program in which the growers were invited to reduce their wheat acreage below 1969 levels and increase summer fallow or perennial forage by the same acreage. In return, they would receive Federal compensation payments. Wheat delivery quotas for the 1970-71 crop year were based on average yield times the total of: (a) 25 percent of their 1969 summer fallow acreage; (b) total acreage of summer fallow in 1970; and (c) the amount by which acreage in perennial forage in 1970 exceeded the acreage in perennial forage in 1969. The program managed to cut the 1970 wheat acreage to about half the 1969 acreage.

LOCATION OF U.S. PRODUCTION CENTERS

Wheat is widely dispersed across the United States, but the heavy concentrations are in the Plains States and the Pacific Northwest. The Eastern Corn Belt also grows a substantial amount of wheat.

A relatively small amount of wheat is produced in areas of low crop intensity, even if wheat represents a large proportion of the crops. This study examines all counties where field crops covered more than 10 percent of the land in 1966, and wheat made up at least 5 percent of the field crops.

Figure 1 outlines the areas in the United States where field crops were grown in significant quantity in 1966. The proportion of field crops to total acreage in each county is indicated in the legend.³ The greatest field crop concentration was in the Great Plains, the Corn Belt, and the Delta area of the mid-South.

Figure 2 outlines the major wheat-producing areas. In developing this map, all counties where field crops made up at least 10 percent of the total land area were included. Classification was by the total of county wheat allotments held by farm program participants in 1966.⁴

³Source of data used to construct this map was the National Soil and Water Conservation Needs Inventory. The inventory referred primarily to the year 1966.

⁴An estimate of wheat acreage harvested was not available for all counties; therefore, the measure "wheat allotments by program participants" was used to indicate the amount of wheat associated with the county. Allotment on participating farms was about 82 percent of total approved allotment for the United States in 1966. In the important wheat-producing States, however, participation was 90-93 percent. And in the important wheat-producing counties of these States, participation was even higher. Hence, in Western States where wheat assumes important proportions, the difference between harvested wheat acreage and allotment wheat acreage was relatively small. In the Southeastern States and Corn Belt, harvested wheat acreage was substantially larger than was accounted for by farm program participants.

Wheat delivery quotas in Australia also were further restricted for 1970-71. Early in 1970, the Australian Wheat Grower's Federation agreed to a 14-percent overall reduction in the 1969-70 delivery quota; under the proposed system, only a small cutback is made in the quotas for prime hard wheat areas, but the reduction amounts to about 22 percent in the soft wheat areas.

Australia's 1970-71 crop is about 26 percent smaller than the previous year's and will fall short of the delivery quota of 318 million bushels.

Argentina, too, is producing less wheat, as are Western and most of Eastern Europe.

Areas with heavier concentrations in wheat are in the Pacific Northwest and Plains States. In the drier parts of these States, wheat is preferred because it is more profitable than the best alternative crop. In fact, some producers in the drier parts contend that it is the only crop they can grow at a profit.

Missouri and the Eastern Corn Belt also grow a substantial amount of wheat, primarily because it fits advantageously into the crop rotation. Also, since 1964 the farmers with a wheat allotment have had a compelling reason for putting at least a minimum of allotment acres to wheat. Program rules have required such a minimum planting to qualify the allotment holder for domestic marketing certificates.⁵

Another significant difference between Missouri and Eastern Corn Belt on the one hand, and the Plains and Pacific Northwest on the other, is reflected in the relative amount of wheat-for-feed grain and feed grain-for-wheat substitution that was employed in 1969. Table 1 shows only a small amount of substitution in Missouri and the Eastern Corn Belt, with no tendency to favor either wheat or feed grain. In the other four subdivisions listed in the table, there was a large amount of substitution, chiefly wheat for feed grain.

Apparently, the substitution clause in the farm program has little significance for the Corn Belt producer who continues to seed a similar proportion of his total acreage to wheat. The same clause, however, has considerable significance to many producers in the 17 Western States where wheat is for the most part the preferred crop on dryland. Wheat

⁵In 1969, for example, by planting at least 43 percent of his allotment, a farmer could qualify for maximum certificates. Marketing certificate payments reflect the projected yield on each farm times planted wheat acreage (up to 43 percent of the farm acreage allotment).

TOTAL FIELD CROP AREA AS A PERCENTAGE OF TOTAL LAND AREA, 1966

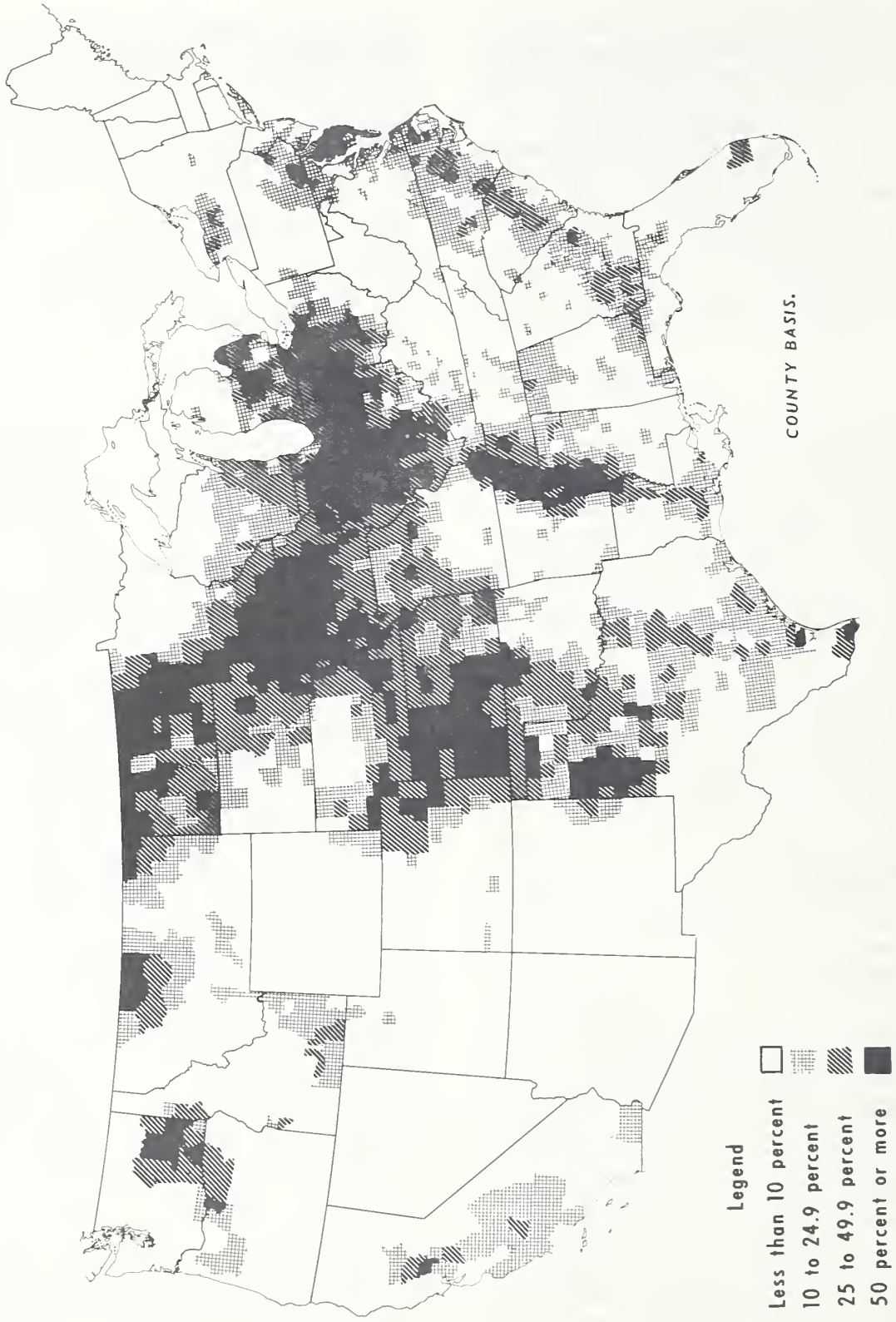
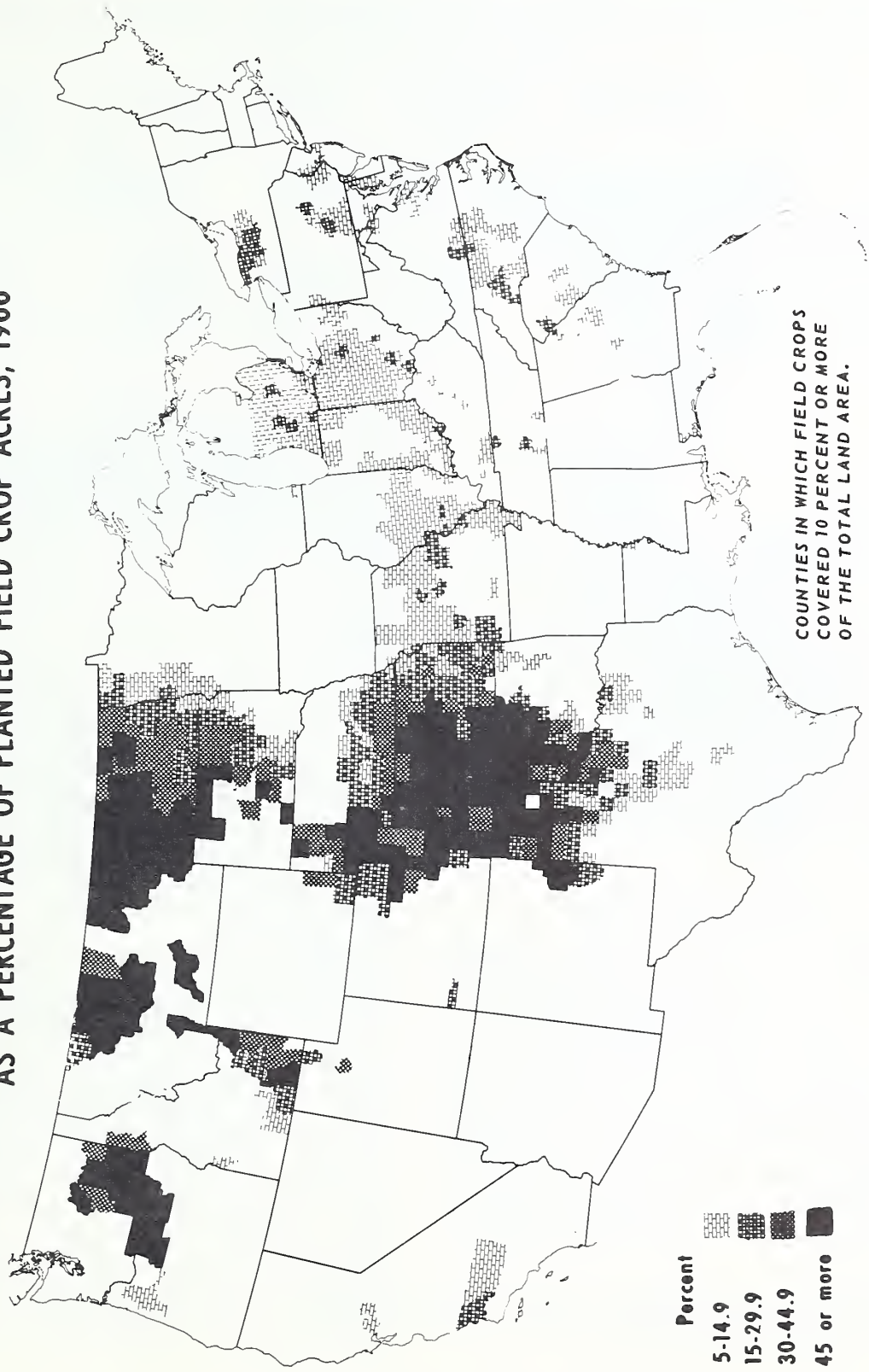


Figure 1

**WHEAT ALLOTMENT ACRES OF PROGRAM PARTICIPANTS
AS A PERCENTAGE OF PLANTED FIELD CROP ACRES, 1966**



Percent

| | |
|------------|--------------------------------|
| 5-14.9 | [Lightest shading pattern] |
| 15-29.9 | [Medium-light shading pattern] |
| 30-44.9 | [Medium-dark shading pattern] |
| 45 or more | [Darkest shading pattern] |

COUNTIES IN WHICH FIELD CROPS
COVERED 10 PERCENT OR MORE
OF THE TOTAL LAND AREA.

Figure 2

Table 1.—Wheat allotment, feed grain base, and acres of feed grain-for-wheat and wheat-for-feed grain substitution in major U.S. wheat-producing areas, 1969

| Item | Pacific Northwest (Idaho, Oreg., Wash.) | | Northern Plains (Mont., N. Dak., S. Dak.) | | Central Plains (Nebr., Colo., Kans.) | | Southern Plains (Okla., Tex.) | | Missouri and Eastern Corn Belt (Mo., Ill., Ind., Ohio., Mich.) | |
|----------------------------|--|-------------------------------|---|-------------------------------|--|-------------------------------|----------------------------------|-------------------------------|---|-------------------------------|
| | <i>Acres</i> | | | | | | | | | |
| Wheat allotment | 3,650,706 | | 12,687,356 | | 14,890,936 | | 8,157,523 | | 6,939,502 | |
| Feed Grain base: | | | | | | | | | | |
| Total feed grain . . . | 2,369,836 | | 14,274,035 | | 21,831,702 | | 15,804,187 | | 29,024,930 | |
| Corn | 216,844 | | 6,577,509 | | 10,258,473 | | 2,062,886 | | 27,752,003 | |
| Grain sorghum . . | 10,345 | | 276,506 | | 9,447,392 | | 12,282,712 | | 755,510 | |
| Barley | 2,142,647 | | 7,420,020 | | 2,125,837 | | 1,458,589 | | 517,417 | |
| | Substitution: | | Substitution: | | Substitution: | | Substitution: | | Substitution: | |
| | Feed grain for wheat | Wheat for feed grain | Feed grain for wheat | Wheat for feed grain | Feed grain for wheat | Wheat for feed grain | Feed grain for wheat | Wheat for feed grain | Feed grain for wheat | Wheat for feed grain |
| | <i>Acres</i> | | | | | | | | | |
| Total feed grain | 1,763 | 502,481 | 41,825 | 1,297,112 | 282,740 | 1,555,091 | 100,504 | 531,028 | 41,237 | 38,553 |
| Corn | 411 | 2,122 | 21,207 | 151,336 | 170,204 | 209,524 | 35,150 | 9,504 | 39,389 | 32,343 |
| Grain sorghum | 34 | 550 | 5,890 | 6,627 | 107,033 | 954,043 | 64,216 | 237,215 | 1,366 | 2,363 |
| Barley | 1,318 | 499,809 | 14,728 | 1,139,149 | 5,503 | 401,524 | 1,138 | 284,309 | 482 | 3,847 |

substituted for feed grain was very common except in the eastern parts of South Dakota, Nebraska, and Kansas where corn-for-wheat tended to offset wheat-for-corn. In Kansas and Texas, there were also significant acreages—primarily irrigated areas—where grain sorghum was substituted for wheat. There were also instances where for one reason or another the winter wheat crop failed to develop properly by spring; this land was then disked up and put into sorghum.

Special Wheat Counties

Although it is somewhat arbitrary to define boundaries for specialized wheat areas, it is useful to identify a set of counties with a minimum proportion of crop acreage in wheat. The level at which to set this minimum was selected with reference to the data used to construct figure 2. It was decided to retain the two classifications (fig. 2) with the highest concentration in wheat. In other words, all counties were included which in 1966 had at least 30 percent of their planted field crops in wheat.⁶ The result was the designation of 281 so-called wheat counties—33 in the Northwest and the remainder in the Plains.

⁶ 1966 was a year with substantial restrictions on permitted acreages. An increase of almost one-third in the national wheat allotment followed in 1967.

Figure 3 shows these counties as the shaded portion of the map.

Wheat has a comparative economic advantage over most other crops in the drier portions of the 17 Western States. Thus, on the deeper, more moisture-retentive soils, wheat is successfully grown with as little as 8 inches of annual precipitation in the Pacific Northwest or with 11 inches in the northwestern Great Plains. The isoprecipitation lines in figure 3 indicate the rate of precipitation associated with various wheat counties. The numbers are average annual precipitation rates in inches for the period 1931-60.

Location of the wheat counties with respect to the isoprecipitation lines shows that wheat is a competitive crop not only under semiarid conditions in the most westerly counties but that it also competes with corn and other crops under subhumid conditions farther east. The eastern edge of the wheat areas for both the Pacific Northwest and the Central-Southern Plains receives 32 inches of precipitation per year.

There are, of course, factors other than annual precipitation that determine where wheat is grown and its importance with respect to other crops. The benefits received through Government wheat programs in contrast to those received from competing commodity programs are an obvious economic factor. Proportion of the annual precipitation which is received during the growing season, and also the

WHEAT SPECIALTY AREAS RELATED TO ANNUAL PRECIPITATION

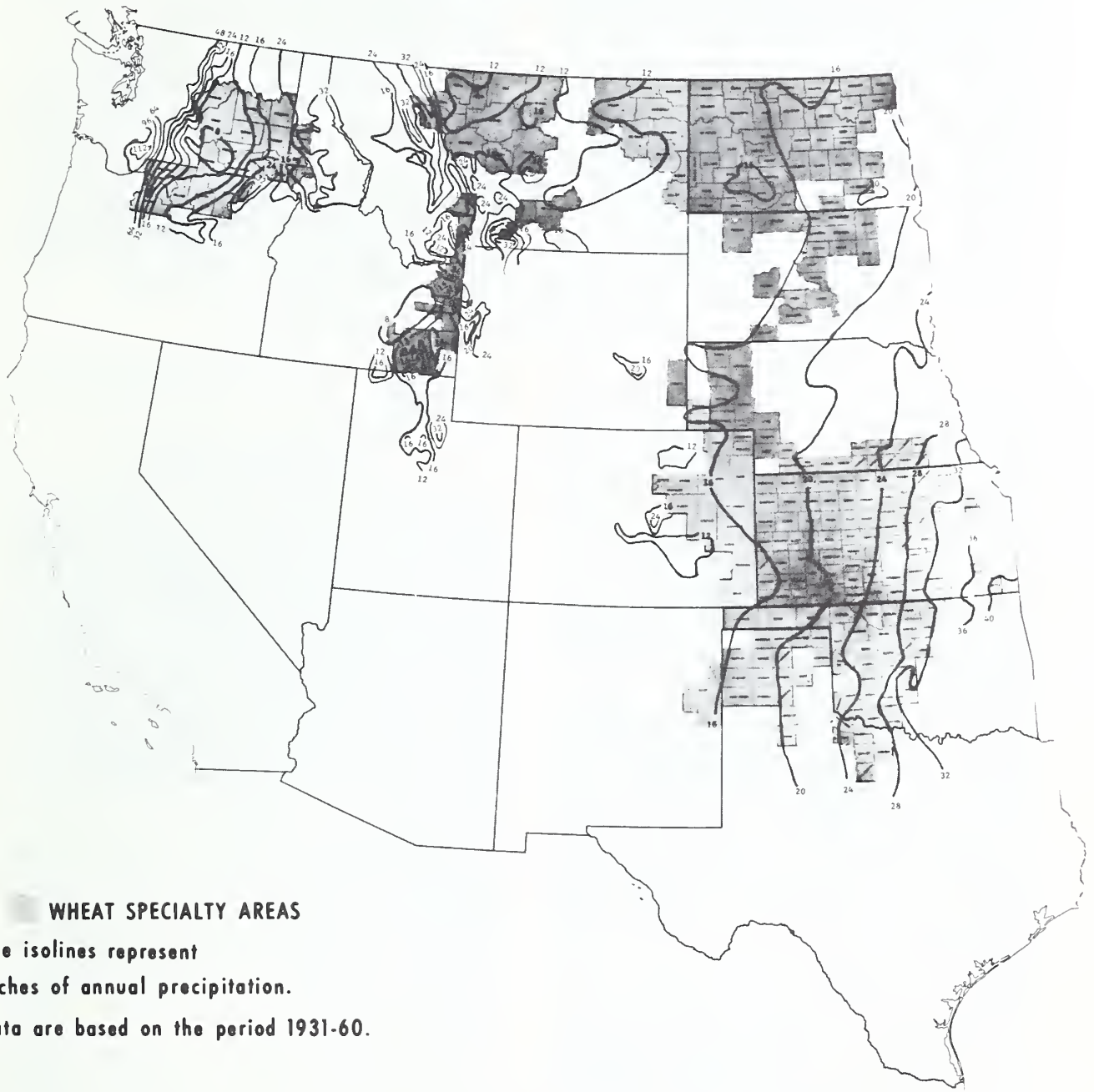


Figure 3

prevailing evapotranspiration rates, are some obvious physical factors that determine where wheat is successfully grown. The moisture-retentive capacity of soils in semiarid areas has already been mentioned as an important physical factor.

Summer fallowing is an important cultural practice in the drier portion of the wheat areas; fields are kept "black" (no growth of any kind is permitted) throughout an entire growing season. This practice, which is accomplished by several cultivations throughout the growing season, aids in retaining a portion of 1 year's moisture for the benefit of the next year's crop. The amount of moisture which can be stored in the subsoil in this manner frequently provides the critical portion of total moisture needed

to bring the following year's crop to an acceptable yield level. In other words, without a carryover of the previous year's moisture to supplement the (usually meager) rainfall of the current season, yields are frequently low and uneconomic.

As the amount of annual precipitation increases, the risk of very low yields from drought decreases. Hence, the need for fallowing becomes less critical. Figure 4 shows the largest proportion of cropland in summer fallow generally associated with the regions of lowest annual precipitation. The proportion in summer fallow decreases as annual moisture increases, and finally in the eastern and southeastern counties of the Central and Southern Plains, continuous cropping becomes the standard practice.

REPRESENTATIVE WHEAT SPECIALTY OPERATIONS

What level of earnings can be obtained by farmers with given skills and a particular level of other resources? How do these returns compare with what similar resources earn in nonfarm employment? These are questions asked by farm leaders, policy advisors, legislators, and others, with reference to specific types of farms and particular geographic regions.

This report examines these questions in terms of representative one-man wheat operations in three widely separated wheat regions. All of the previously specified wheat counties are located in the Northwest and Plains States. The wheat operations depicted in this report are adapted to these States.

These producers grow only wheat when the market is favorable and when no restrictions are placed on wheat acreage permitted. They substitute other cash crops to the extent that wheat acres may be curtailed by allotments or winterkilled and replaced by a spring-seeded crop. Income consists only of receipts from the sale of cash crops and from transfer payments related to Government programs. This type of wheat operation is generally found within sizeable stretches of relatively level terrain, interspersed with only a small portion of land unsuitable for cultivation.⁷

A farm which produces only wheat (or another cash grain crop in lieu of wheat) permits the adoption of a fairly simple accounting procedure. All costs can be attributed to the cash crop enterprise. If the total operation has several enterprises, arbitrary allocations of costs must often be made as, for example, to the

cattle enterprise or perhaps to the sugarbeet enterprise.

Wheat Farm Viability

What would be the minimum size for a viable wheat operation? The answer is indeterminate, but judgment combined with recent research can provide considerable guidance in this area. Work published in 1969 by the Montana and Washington Agricultural Experiment Stations⁸ provides costs of production and returns budgets for several sizes of farms in each State. The Montana study concludes that a north-central Montana operator with 1,800 cropland acres (900 in crop and 900 in summer fallow each year) has a full time job. The study further concludes: "When wages to the operator are ignored, costs per unit are nearly as low as they can get when 900 acres of crop is reached."

The Washington study poses budgets for 10 different sizes of farm in different parts of eastern Washington. In each case, given a particular line of machinery, the farm selected was considered large enough to have nearly exhausted the economies of machinery use obtained from increasing farm size. In the drier areas, where the wheat-fallow rotation is commonly practiced, the ideal farms ranged from 1,300 to 2,400 cropland acres.

These studies and judgment were used to arrive at a farm size which is consistent with a number of criteria. One was that the farm should be viable in the sense that a better-than-average operator would be prepared to step in and run it as a business venture. It

⁷ Among large farms, this "dryland crop" organization specializing in wheat plus other cash crops is fairly common in areas with a high percentage of cultivated land. It is not suggested that this is necessarily a better or a more profitable organization than, say, farms organized under a "dryland crop-livestock" or "irrigated farm" classification.

⁸ Bulletin 626, Montana Agricultural Experiment Station, Bozeman, and Circular 501, Washington Agricultural Experiment Station, Pullman.

SUMMER FALLOW ACREAGE AS A PERCENTAGE OF TOTAL FIELD CROP ACREAGE, 1966

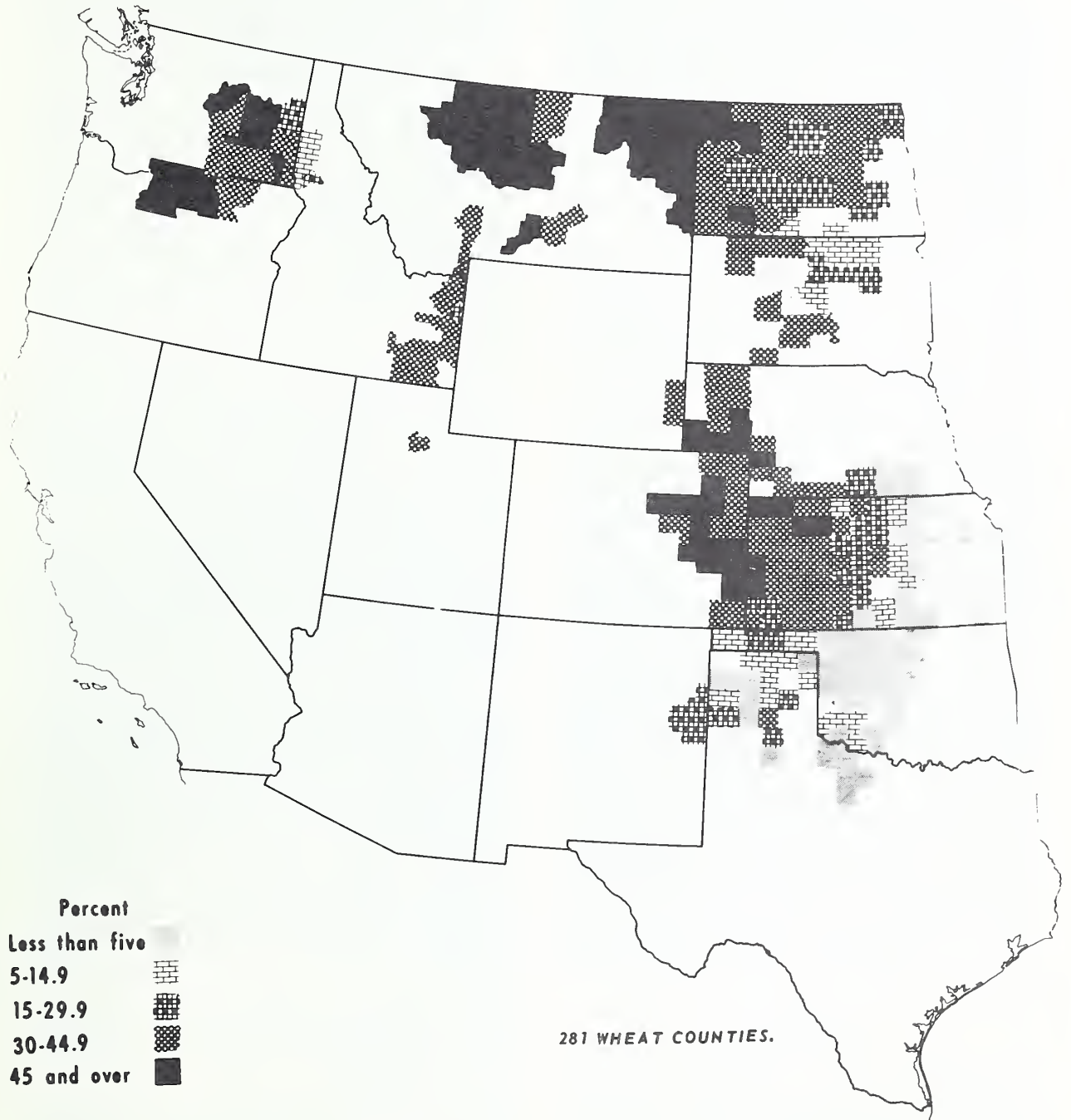


Figure 4

should provide full-time, profitable employment of his time, and over the long run provide him with a satisfactory income level.

The size of farm chosen for closer analysis consists of 3 sections of land (1,920 acres) in the crop-fallow areas. A comparable size in other wheat areas would range downward to 1½ sections where there is sufficient moisture for continuous cropping of the land. The operator of this unit is a "better than average" manager, 40 to 50 years of age, and a "good" mechanic. He can weld and make minor repairs, but depends on repair shops for major overhauls, transmission work, and other major tractor and machinery repairs.

The size of farm is a one-man, full-time operation requiring little or no help from hired labor or hired custom work. The operator has a full line of machinery of a size adequate to ensure timeliness in the field operations. The machinery is maintained in good condition because for this size of operation—"its got to go when you want it to go."

The winter months are a slack period for the wheat producer. The time is spent very profitably on such activities as (1) repair work needed for an efficient operation, (2) recordkeeping neglected during the busy seasons, (3) reading and visiting with Agricultural Stabilization and Conservation Service personnel to keep informed on Government programs, (4) attending meetings, etc., to keep up with improvements in farming, and (5) landlord consultations.

Full land ownership is no longer the chief goal for the typical entrepreneur of this size of business. He may, of course, inherit such a large proportion of the business that full ownership is easily achieved. More often, he inherits only a limited amount of capital, but brings with him the managerial talent and technical know-how to operate a modern wheat farm. As a means of achieving the necessary land resources he turns increasingly to renting more of his land. Part ownership is usually his goal, and he borrows more money toward purchases than in the past; but risks due to variable weather and the uncertainty of world markets and Government programs still engender considerable caution among wheat producers.

The Study Farm

A farm of the size and type described was chosen for close study in each of the three main wheat-growing regions—Pacific Northwest, Northern Plains, and Central-Southern Plains. The rotation on this farm was crop-summer fallow. This is a less intensive cultural practice than is used with continuous crop-

ping, i.e., 2 acres of cropland are required for each acre of crop harvested. Hence, total cost of field work per acre of crop harvested tends to be higher where fallowing is practiced. Summer fallow needs four to seven cultivations, depending on the number of weed crops germinated by varying amounts of rain received during the time the land is fallow.

Information on organization, production, costs and returns was obtained from the best available sources. In some cases, data from several sources were combined to develop the farming situation being depicted.

The wheat and feed grain allotments suggested for this farm represent an approximate average for farms of this size in the study area. The operator was a participant in the wheat and feed grain programs and took full advantage of the program provisions for his farm.

Proportion of rented land in the part-owned farms presented approximates the average for farms with 1,200 to 2,500 cropland acres in the areas represented. Most operators owned some land and rented the rest. A few of the operators were full owners; several rented all their land. Wheat certificate payments were divided between operator and landlord the same way they shared their crop returns.

Most farm operators contacted in a survey were essentially debt free. The remainder reported debts ranging from \$1,500 to \$100,000. In the study farms, the debt assumed against the operator's assets was approximately a modal average of the debts reported by the survey.

The following analysis deals in turn with three areas. Characteristics of the farm for each area are examined, and a balance sheet is presented for the farm. A costs and returns picture of the business is then presented for 1969 and a net financial return is determined. The net return is partitioned into component parts in an effort to allocate portions going to identifiable resource categories. The analysis is extended to observe the degree to which the farm's returns covered economic costs as well as the farm's production costs. Economic costs are the costs of holding resources in a certain business for a specified period.

Comparisons are made with possible earnings realized in 1968 and 1967. Supplemental analysis looks at effects of some variations in farm tenure on returns to operators.

The study farms are located on average to better-than-average land. Consequently, farm families living on the lighter soils within the same precipitation zone can be expected to net less from their operations than families associated with the study farms.

COSTS AND RETURNS ANALYSIS BY MAJOR WHEAT REGIONS

Pacific Northwest. The Pacific Northwest region includes the wheat counties in Washington, Oregon, and Idaho. The operation studied represents a viable-size wheat fallow farm in the 9- to 12-inch precipitation area of east-central Washington.

Characteristics of the study farm are shown in table 2. The operator owns about 40 percent of the cropland and rents the rest from two different landlords. Alternative crops on this land cannot compete economically with wheat; therefore, the plan for 1969 called for planting wheat to the full extent of the farm allotment and substituting wheat for barley and wheat for oats-rye to a degree permitted under 1969 program rules. The result was that 777 acres were planted to wheat in the fall of 1968. The 123 acres that had been in summer fallow during the preceding growing season were maintained in fallow for another season⁹ along with 900 acres of new fallow. Program rules required a minimum of 1,023 acres in conserving uses on this farm during 1969, and summer fallowing was the adopted conserving use.

Reference to the 1964 U.S. Census of Agriculture gives some appreciation of the relative position of the study farm among all farms in the 9- to 12-inch rainfall area of Washington. The counties of Adams, Douglas, Franklin, Grant, and Lincoln were used to represent this area. In the five counties, 4,926 farms covered an area of 5.43 million acres—59 percent was cropland; about one-seventh of the cropland was irrigated.

Total acreage harvested in 1964 was 1.6 million. Each of nearly 300 farms harvested 1,000 or more acres of this cropland. Another 750 farms harvested between 500 and 1,000 acres each. The study farm would be included in this second classification. Table 3 shows the distribution of farms by size and type of farm.

Value of all farm products sold in the five counties in 1964 approached \$150 million, two-thirds of which was from field crops other than vegetables and fruits and nuts; 2,400 farms were classified "field crop farms other than vegetable and fruit and nut" and 2,067 of these were termed "cash grain farms." Livestock and livestock products other than poultry and dairy accounted for \$40 million worth of farm product sales; 556 farms were classified "livestock farms other than poultry and dairy." Two other

⁹ Land in fallow for 2 growing seasons (double summer fallowing) does not, in general, yield better than land fallowed for 1 season only. Yet, the cost of keeping a tract free of weeds for 2 seasons is nearly twice the cost for 1 season. Land fallowed for 2 years in succession is subject to greater erosion in the second year than during the first.

important classifications were "general farms" (1,078) and "fruit and nut farms" (269).

The size of the 1969 crop was disappointing in much of the wheat-fallow areas of Washington; yields averaged about one-third lower than normal. A further squeeze on profits resulted from a severe reduction in crop acreages. For program participants, wheat allotments were reduced 13 percent from the previous year's levels, and acreage equal to 15 percent of this allotment was required to be diverted to conserving use. Also, acreage equal to 20 percent of the barley base and 15 percent of the oat-rye base had to be diverted to a conserving use if these bases were used to produce additional wheat. All acres diverted to conserving use were in addition to the established conserving base.

A balance sheet of the study farm for 1969 is given in table 4. Prices for land fell sharply following realization of the poor 1969 crop, and in light of the general deterioration in the wheat market outlook. To reflect a longer term value, land values used in table 4 represent an average of prices paid in a 3-year period ended March 1, 1970.

The typical producer of crops has come to recognize the economies of size to be gained from enlarging his acreage. The marginal (additional) cost of operating an acre of land added to the producing unit is small, compared with the average cost per acre for all acres in the farm. Hence, each acre added tends to reduce the average production cost per acre.

Farmers' bids to increase the size of their units have caused the price for the additional land to be higher than the productivity value of all their land. Thus, the price paid for a relatively small proportion of land purchased for addition tends to be higher than the average value of all land. Any given farmer, however, could sell his farm at the current market price. Therefore, the investment at current prices represents an opportunity cost to him.

The machinery complement for the study farm consists of a relatively new 92-drawbar-horsepower crawler-type tractor and an older 2-3 plow wheel-type tractor. There are two 2-ton trucks—one relatively new, the other quite old. An 18-foot self-propelled combine, a ¾-ton pickup, and the family automobile, all relatively new, make up the remainder of the power machines. There is also a full line of tillage and seeding equipment, fuel and grease equipment, and shop tools and shop equipment. Total value of all assets controlled by the operator for this size operation is nearly \$400,000.

The operator has no facilities for storing grain and consequently the wheat is hauled directly from the

Table 2.—Viable-size wheat-fallow farm, Pacific Northwest, 1969

| Characteristic | Unit | Own land | Rented land | Total operation |
|----------------------------------|---------|----------|-------------|-----------------|
| Total acreage in farm | Acre | 800 | 1,120 | 1,920 |
| Cropland in farm | do. | 750 | 1,050 | 1,800 |
| Conserving base | do. | 367 | 515 | 882 |
| Wheat allotment | do. | 221 | 309 | 530 |
| Barley base | do. | 97 | 135 | 232 |
| Oat-rye base | do. | 37 | 53 | 90 |
| Projected wheat yield | Bu./Ac. | 37 | 37 | 37 |
| Projected barley yield | do. | 40 | 40 | 40 |

Table 3.—Number and proportion of farms by size and type in selected counties, Pacific Northwest, 1964¹

| Classification | Number of farms | Percent of farms |
|--|-----------------|------------------|
| <i>Acres of cropland harvested per farm</i> | | |
| Less than 500 | 3,576 | 77.3 |
| 500 to 999 | 752 | 16.3 |
| 1,000 or more | 295 | 6.4 |
| <i>Type of farm</i> | | |
| Field crop farms, other than vegetable and fruit and nut | 2,400 | 51.9 |
| Cash grain farms | 2,067 | 44.7 |
| General farms | 1,078 | 23.3 |
| Livestock farms other than poultry and dairy | 556 | 12.0 |
| Fruit and nut farms | 269 | 5.8 |

¹ Counties: Adams, Douglas, Franklin, Grant, and Lincoln in Washington State.

Source: 1964 U.S. Census of Agriculture.

Table 4.—Balance sheet, viable-size wheat-fallow farm, Pacific Northwest, 1969

| Item | Operator | Landlord | Total operation |
|-----------------------------------|-----------|--------------|-----------------|
| Assets: | | | |
| Land | \$141,062 | \$197,488 | \$338,550 |
| Machinery and equipment | 50,460 | — — — | 50,460 |
| Machine shed and shop | 3,500 | — — — | 3,500 |
| Operating capital | 5,000 | — — — | 5,000 |
| Total assets | \$200,022 | \$197,488 | \$397,510 |
| Liabilities: | | | |
| Real estate debt | 24,000 | ¹ | 24,000 |
| Non-real-estate debt | 10,000 | ¹ | 10,000 |
| Total liabilities | 34,000 | — — — | 34,000 |
| Net equity | \$166,022 | \$197,488 | \$363,510 |

¹ Zero debt was assumed. No information on landlord debt was available.

combine to the local elevator. The landlords pay a portion of the storage costs accruing from the time the wheat is initially stored in the warehouse until it is sold. The landlords also pay for some of the fertilizers, herbicides, insurance, miscellaneous travel and telephone, accounting and legal fees.

The only labor hired is a 20 man-day complement to help with the hauling of wheat from the combine to the elevator. Any other help required by the operator is arranged on an exchange basis with the neighbor.

A list of operating costs and returns pertaining to the study operation for 1969 is given in table 5. One hundred ninety-five acres of winterkilled wheat had to be reseeded to spring wheat in the spring of 1969. Average yield realized for the spring wheat was 20 bushels per acre; the winter wheat yielded 29 bushels per acre.

Partitioning Returns to Resources

In examining the adequacy of returns to resource inputs, net returns were partitioned and allocated to the several components. This process aids in measuring the extent to which resources are being compensated for their services. Partitioning also affords a better analysis of questions such as the relative merits of renting versus buying land. It helps to explain a possibly different attitude by an operator who inherited most of his land from one who had to purchase his land and pay for it out of his own resources.

In so far as information is available to partition financial returns, a logical method exists for allocating the earnings of a farm among the inputs by whose activities the earnings were generated. These inputs are discussed in connection with the net return on the farm depicted.¹⁰

With respect to this farm, it is assumed that the operator received title through inheritance to 3 quarter-sections of the land he operates. He took possession of this land in 1956. He purchased an additional half section in 1965, paying \$39,000, and still owes \$24,000. He also owed \$10,000 in 1969 against \$59,000 worth of machinery, equipment, and operating capital.

¹⁰ Don Bostwick suggests a procedure for allocating financial returns in "Partitioning Financial Returns: An Application to the Growth of Farm Firms," U.S. Dept. Agr., ERS 390, 1969. Partitioning returns by function was suggested earlier by Warren Bailey, in Farm Growth and Financial Management, Proc. Joint Mtg., Farm Mangt. & Mktg. Res. Committees, Western Agr. Economic Research Council, Las Vegas, Nev., Nov. 7-9, 1967.

From his 1969 gross income, the operator paid his share of the production expenses and the rent. He also paid the interest on the debt and allocated a proper amount for depreciation on machinery, equipment, and shop. A part of the income should be allocated to investment in the land which he inherited, based on the value of this land in 1956. The net remaining is regarded as the return to his own personal inputs. How much should be allocated to an investment return, an ownership return, and the (residual) return to labor and entrepreneurship?

Proper analysis of the farm business vitally depends on the ability to evaluate the returns from each input into the business. Some financial returns originate as interest from the "investment" itself. The rate of interest (return to investment) depends on the market rate of money which prevailed when the actual investment was made. Where a "credit" purchase was made, the contracted rate of interest on the loan becomes the rate of return to investment—the outside source of credit is referred to as an *exogenous* investor. Where the *farm firm* provided the resources for an investment, the rate of interest adopted should reflect a real opportunity rate which the firm could have realized. For example, the money invested in a new piece of machinery might have been deposited in a savings and loan association and earned the interest rate the association was paying at the time.

Other returns come from "ownership" as an input. Assets, whether in the form of land or machinery, could be rented out and rental collected for use rights. From the gross rent, one must first subtract ownership costs, such as taxes and maintenance, to arrive at a net rent. One must then subtract the return to investment, regardless of whether or to what extent the investment is firm or exogenous. The remainder is regarded as *net* ownership return.

Another aspect of ownership returns relates to the fact that the market value of an asset changes over time. An increment is added to (or decrement subtracted from) ownership returns to reflect the "potential" capital gains (losses) from holding an asset for a given period. For example, suppose the market quotes certain land at \$3.00 per acre higher at the end of a year than at the beginning. One should then add \$3.00 per acre to net ownership returns as determined above. After fully accounting for investment and net ownership returns, the residual return is allocated to operator's input of labor, risk-taking, and management.

Return to Land Investment

The operator invested \$39,000 in 2 of the 5 quarter-sections of land he owns. He would allocate a

Table 5.—Costs and returns, wheat-fallow study farm, Pacific Northwest, 1969

| Item | Operator | Landlord | Total operation |
|--|---------------|--------------|-----------------|
| Gross income: | | | |
| Wheat sales | \$20,720 | \$5,240 | \$25,960 |
| Domestic marketing certificates | 10,230 | 2,587 | 12,817 |
| Total income | <u>30,950</u> | <u>7,827</u> | <u>38,777</u> |
| Operating expenses: | | | |
| Seed purchases | 1,569 | — | 1,569 |
| Fuel, oil and grease | 1,212 | — | 1,212 |
| Repairs and supplies | 3,750 | — | 3,750 |
| Fertilizer and herbicides | 2,668 | 656 | 3,324 |
| Storage and hauling | 1,353 | 342 | 1,695 |
| Hired labor | 300 | — | 300 |
| Insurance | 575 | 35 | 610 |
| Taxes | 2,230 | 2,747 | 4,977 |
| Miscellaneous costs | 596 | 155 | 751 |
| Total operating expense | <u>14,253</u> | <u>3,935</u> | <u>18,188</u> |
| Return to capital, entrepreneurship and operator's labor | \$16,697 | \$3,892 | \$20,589 |

portion of the firm's earnings as a return to this investment. The rate of return used in the allocation should probably be the contractual interest rate of 5 percent on the loan from the mortgage company. On this basis, the business might allocate a sum of \$1,950 as a return to investment on the land that the operator purchased. His part of the return is \$750 based on his \$15,000 equity. The remaining \$1,200 is allocated to the mortgage company as exogenous investor.

The 3 quarter-sections of land inherited by the operator were accorded an investment return based on the market value at the time the land was deeded to him. To satisfy this return, the business was charged \$2,610—a rate of 4.5 percent on \$58,000.

Return to Land Ownership

Ownership returns are given by the market rate at which use-rights may be rented from the owner. In wheat areas, there is usually a well-established rental market in the use-rights of cultivated land. The typical rental agreement is one in which the owner receives designated shares of the crop and Government payments.

In the present case, the landlords received a rental of \$7,827 as their (one-third) share from 7 quarter-sections of land. (See table 5, column 2.) After paying taxes and other items charged to them, they netted \$3,892—a relatively low return because of the poor crop in 1969.

Another factor influencing returns to land ownership is the change in the land's market value over

time. If there is an appreciation in value, the owner is credited with a potential positive return to land ownership, because the "book" value of his land has gone up. If there is a depreciation in value this part of the return is negative. The trend set by the changes in land value during the 1960's reflects an annual average rise of \$3.95 per acre of improved land in Crop Reporting District 5 of Washington. An extension of this trend indicates an increase of \$4,148 "book" value during 1969 on the 7 quarter-sections owned by the two landlords.

Using the same *rate* of return as the landlords realized from their 7 quarter-sections, the operator could have obtained on his own 5 quarter-sections a net rental of \$2,780 and a land appreciation of \$2,965, had he rented out his land. This amount of \$5,745 may be regarded as return to his land ownership. To arrive at a net ownership return, it is necessary to subtract \$4,560 which is total investment return to all the land owned by the operator.

Return to Nonland Assets

A rental rate for the use-rights on nonland resources is usually not available because there is not an established market for services flowing from most of these resources. Thus, an ownership return is not determined. A way is suggested for deriving an investment return on machinery, equipment, and operating capital: Adopt 1969 market values for these items and use an imputed rate of interest—say, a rate equal to the interest rate paid by savings and loan

associations during the years in which money was invested in machinery and equipment.

A rate of 5 percent was adopted as appropriate for calculating an investment return on \$43,960 worth of nonland assets, and on \$5,000 worth of operating capital. The result was an allocation of \$2,448 as a return to investment in the operator's equity in resources other than land. The exogenous investor received \$700 as interest on the \$10,000 non-real-estate debt.

Changes in Capital Value

As previously indicated, the study farm represents capital resources approximating \$400,000 at present prices. The values of certain of these resources can change significantly over a relatively short period of time.

In the case of most nonland resources, there is a continual erosion in value due to obsolescence and wear associated with these assets. This reduction in value, although not a cash cost, is part of the cost of operating the farm. Depreciation for the present farm was \$4,768 in 1969.

The impact of potential capital gains or losses in land values was discussed under "returns to land ownership." Allowance for a change in capital value was based on a 1-year segment of a long-term trend. Changes in land values from one year to the next are based on the average market price of the few parcels of land that changed hands over a previous 12-month period. Wide fluctuations in land prices could exag-

gerate actual value changes, and the appropriate trend might not be reflected at all.

Summary of Resource Returns

Within the limitations pointed out in the foregoing discussion, a partitioning process is applied to the Pacific Northwest farm. This is summarized in outline form in table 6. The 1969 returns provided the operator an appropriate yield on his land investment and a net ownership return to land of \$1,185. The residual remaining for his labor and entrepreneurship came to \$6,000.

In the long run, the operator of the study farm would expect to fare considerably better. In an average year, he anticipates little or no winterkill of his fall planted wheat, wheat yields about one-third higher, and fewer restrictions on the acreage he can plant to profitable crops.

Comparisons With 1968 and 1967

Under the wheat program, the rules on permitted wheat acreage were considerably less restrictive in 1968 and in 1967 than in 1969. The study farm's wheat allotment was about 610 acres in 1968 and about 700 acres in 1967. Also in those 2 years, the producer was permitted to substitute wheat on his entire barley and oat-rye base acreages. Hence, the operator was permitted fully 900 acres of wheat harvested in both years, and the opportunity for profit was considerably better than in 1969. An

Table 6.—Gross income, operator's net return, and partitioning of the operator's net return from a part-owned modern wheat-fallow farm, Pacific Northwest, 1969

| | | |
|--|----------|----------|
| Gross farm income | \$38,777 | |
| Add value appreciation on 5 quarter-sections of land | 2,965 | \$41,742 |
| Less share rent | | 7,827 |
| Gross income after rent deduction | | 33,915 |
| Less expenses: | | |
| Operating expenses as listed in table 5 | 14,253 | |
| Other charges to the farm business: | | |
| Interest on real estate debt (\$24,000 × .05) | 1,200 | |
| Interest on non-real-estate debt (\$10,000 × .07) | 700 | |
| Depreciation on machinery, equipment, and shop | 4,768 | 20,921 |
| Return to operator's resources | | 12,994 |
| <i>Partitioning the Return to Operator's Resources</i> | | |
| Return to operator's investment in: | | |
| ¼ section of inherited land (\$58,000 × .045) | 2,610 | |
| His equity in the ½ section purchased land (\$15,000 × .05) | 750 | |
| His equity in machinery, equipment and shop (\$43,960 × .05) | 2,198 | |
| Operating capital (\$5,000 × .05) | 250 | |
| Net return to operator's ownership in land | 1,185 | |
| Return to operator's labor and entrepreneurship (residual) | 6,001 | 12,994 |

estimate of net financial returns on the study farm in 1968 and 1967 shows a substantially better picture for the selected Pacific Northwest area.

Wheat yields averaged about normal in these 2 years, and prices received for wheat were about 11 percent higher than in 1969; total receipts from domestic marketing certificates, however, averaged 10 percent lower.¹¹ Calculations of returns and costs were based on 900 acres of wheat in each year.

The landlords averaged \$7,900 per year—a net return on their capital in 1967-68 of more than twice the amount they earned in 1969. The operator realized more than 2½ times as much return on his own resources as he earned in 1969.

When the average of the 1967 and 1968 operator's return was partitioned, similarly to the process used in table 6, his net return to land ownership was \$4,065 per year; the entrepreneurial and operator's labor return (residual) totaled \$18,999 per year.

Supplemental Analysis

On larger wheat farms, the portion of land owned by the operator ranges all the way from total to no ownership; the most usual tenure (part ownership) is somewhere between. The foregoing analysis examined a case where about 40 percent of the land was owned by the firm's operator. In this supplemental analysis, we look very briefly at two other types of tenure: Full ownership and zero ownership in land. It is assumed that the plans and practices used in the operation, would not change with a change in the level of ownership.

Full Ownership of the Land

Using the same 3-section farm size, it is now assumed that the operator is an indebted owner of all the land and other assets on this farm. The farm's 1969 characteristics, balance sheet, costs and returns correspond to the last column ("total operation" column) of tables 2, 4, and 5. The assumed liabilities are the same as those listed in table 4; the investments are also assumed to be the same as in the preceding analysis, except for the investment in an additional 7 quarter-sections of land formerly rented. Let us assume that these 1¾ sections of land were inherited in 1956.

The gross operating income is still \$38,777, but since the operator owns all the land, there are no deductions made to pay for rent. Land appreciation is now calculated on 12 quarter-sections and equals \$7,110 per year. Operator's expenses now also

¹¹ Wheat parity averaged about 10 percent lower on July 1, 1968 and 1967 than on July 1, 1969.

include the \$3,935 formerly paid by the landlords. The new return to operator's resources is \$21,031.

In partitioning the financial returns, the investment returns are as in table 6 except for the allocation to the additional owned land. The new net ownership return to land has risen to \$3,132, leaving the full owner \$6,001 to compensate for his labor and management in 1969. Table 7 shows the full owner's return to his resources and the partitioning of these returns.

In 1967-68, the full owner would have fared better. Using the farm depicted with full ownership, the average 1967-68 return to operator's resources was \$32,240. In partitioning this return, using the same investment return to land, the net ownership return to land was \$10,044. This left a return to entrepreneurship and operator's labor of \$19,000.

Zero Ownership in Land

Consider now an operator who rents all the land in his 3-section farm, but owns the other assets. Because he owns no land he has no real estate debt, but owes \$10,000 on his non-real-estate assets. Investments are assumed to be the same as were initially applied to the study farm. How would this operator have fared in 1969 and as an average for the 2 previous years?

His 1969 gross income after rent deduction was \$25,361. After further deductions of the applicable production and capital expenses, his return to operator's resources was \$8,449. In partitioning this return, an investment return is allocated to machinery, equipment, and operating capital. A residual of \$6,001 remains as compensation for operator's labor and entrepreneurship. Table 8 summarizes information pertaining to the full renter.

Given the conditions of 1968 and 1967, a renter would have realized \$37,815 per year of gross income after deduction of rent. After expenses, there was a return to operator's resources of \$21,449. An allocation of \$2,450 as the operator's return to his investment in machinery, equipment, and operating capital, left the sum of \$18,999 to compensate for his labor and entrepreneurship.

A summary showing returns to operator by crop year, land tenure, and resource component is given in table 9.

Northern Plains. The wheat region designated Northern Plains includes Montana east of the Rocky Mountains, plus North Dakota and South Dakota. The study farm is in the 12- to 15-inch precipitation area lying on both sides of the Montana-North Dakota line below the Canadian border.

Characteristics of the study farm are shown in table 10. The wheat yields projected for this farm

Table 7.—Gross income, operator's net return, and partitioning of the operator's net return from a fully owned modern wheat-fallow farm, Pacific Northwest, 1969

| | | | |
|---|----------|---------------|---------------|
| Gross farm income | | \$38,777 | |
| Add value appreciation on 3 sections of land | | 7,110 | |
| Gross income plus land appreciation | | <u>45,887</u> | |
| Less expenses: | | | |
| Operating expenses (see table 5) | \$18,188 | | |
| Other charges to the farm business: | | | |
| Interest on real estate debt | | 1,200 | |
| Interest on non-real-estate debt | | 700 | |
| Depreciation on machinery, equipment, and shop | | <u>4,768</u> | 24,856 |
| Return to operator's resources | | | <u>21,031</u> |
| <i>Partitioning the Return to Operator's Resources</i> | | | |
| Return to operator's investment in: | | | |
| 2½ sections of inherited land | | 8,700 | |
| His equity in the ½ section purchased land | | 750 | |
| His equity in machinery, equipment, and shop | | 2,198 | |
| Operating capital | | 250 | |
| Net return to operator's ownership in land | | 3,132 | |
| Return to operator's labor and entrepreneurship | | <u>6,001</u> | 21,031 |

Table 8.—Gross income, operator's net return, and partitioning of the operator's net return from a fully rented modern wheat-fallow farm, Pacific Northwest, 1969

| | | | |
|---|----------|---------------|--------------|
| Gross farm income | | \$38,777 | |
| Less share rent | | <u>13,416</u> | |
| Gross income after rent deduction | | 25,361 | |
| Less expenses: | | | |
| Operating expenses | \$11,444 | | |
| Other charges to the farm business: | | | |
| Interest on non-real-estate debt | | 700 | |
| Depreciation on machinery, equipment, and shop | | <u>4,768</u> | 16,912 |
| Return to operator's resources | | | <u>8,449</u> |
| <i>Partitioning the Return to Operator's Resources</i> | | | |
| Return to operator's investment in: | | | |
| Machinery, equipment, and shop | | 2,198 | |
| Operating capital | | 250 | |
| Return to operator's labor and entrepreneurship | | <u>6,001</u> | 8,449 |

Table 9.—Returns to operator of Pacific Northwest farm by crop year, land tenure, and resource component

| Crop year | Tenure in land | | | | | |
|---------------------------|---------------------------------------|-------------------------------|---------------------------------------|-------------------------------|--|-------------------------------|
| | Part owner Return to operator for— | | Full owner Return to operator for— | | Full renter Return to operator for— | |
| | Land ownership (net) | Labor and entrepreneurship | Land ownership (net) | Labor and entrepreneurship | Land ownership (net) | Labor and entrepreneurship |
| | <i>Dollars</i> | | | | | |
| 1969 | 1,185 | 6,001 | 3,132 | 6,001 | — | 6,001 |
| 1967-68 average | 4,065 | 18,999 | 10,044 | 18,999 | — | 18,999 |

were 35 percent lower than the yields projected for the Pacific Northwest farm. Barley, however, is competitively a better crop in the Northern Plains.

The conserving base is 18 percent smaller than on the farm depicted for the Pacific Northwest. This indicates that historically the proportion of cropland

in summer fallow in the 12- to 15-inch rainfall area of the Northern Plains was nearly one-fifth smaller than in the 9- to 12-inch rainfall area of the Pacific Northwest. Hence, the conserving base (varying with the acreage devoted to conserving uses during a given previous period), is also smaller for the Northern

Table 10.—Viable-size wheat-fallow farm, Northern Plains, 1969

| Characteristic | Unit | Owned land | Rented land | Total operation |
|----------------------------------|---------|------------|-------------|-----------------|
| Total acreage in farm | Acre | 960 | 960 | 1,920 |
| Cropland in farm | do. | 900 | 900 | 1,800 |
| Conserving base | do. | 360 | 360 | 720 |
| Wheat allotment | do. | 265 | 265 | 530 |
| Barley base | do. | 108 | 108 | 216 |
| Oat-rye base | do. | 16 | 16 | 32 |
| Projected wheat yield | Bu./Ac. | 24 | 24 | 24 |
| Projected barley yield | do. | 34 | 34 | 34 |

Plains farm. The smaller conserving base permitted the operator to crop fully one-half his cropland in 1969 and thus obviated the need for any double summer fallowing which program rules had required of our operator in the Pacific Northwest.

Reference to the 1964 U.S. Census of Agriculture indicates the approximate relation of the Northern Plains study farm to other farms in the 12- to 15-inch precipitation area below the Canadian border. Daniels, Roosevelt, and Sheridan Counties in Montana, plus Divide and Williams Counties in North Dakota were used to represent this area. In the five counties, 3,917 farms covered 5.52 million acres—58 percent was cropland; only 19,000 acres were irrigated.

One and a half million acres of cropland were harvested in 1964. Each of nearly 200 farms harvested 1,000 or more acres of this cropland. Each of another 825 farms harvested between 500 and 1,000 acres. Our study farm would be included in this second classification. Table 11 shows the distribution of farms in the area by size and type of farm.

Value of all farm products sold in the five counties in 1964 was \$45 million, three-fourths of which was from sale of field crops other than vegetables and fruits and nuts; 2,970 farms were classified "field crop farms other than vegetable and fruit and nut,"

and all but 10 of these were classed as "cash grain" farms. Sales of livestock and livestock products other than poultry and dairy total \$10.5 million; 470 farms were classified "livestock farms other than poultry and dairy."

The 1969 crop turned out very well in the Northeast Montana-Northwest North Dakota area—yields were about one-third above normal. Acreage restrictions on the more profitable crops, however, did not permit the producers to take full advantage of the excellent conditions which produced this favorable crop.

Plantings for the spring of 1969 included 400 acres to hard red spring wheat, 224 acres to durum wheat, 176 acres to safflower, and 100 acres to barley.

A balance sheet of the study farm for 1969 is given in table 12. Land was valued at the average market price paid for parcels which changed hands in the 3-year period ending in March 1970. Other assets were valued at 1969 prices.

The power machines assumed for this farm consist of a relatively new 100-drawbar horsepower wheel-type diesel tractor, an older 60-drawbar horsepower wheel-type tractor, and an old utility tractor. There is a relatively new 18-foot self-propelled combine, two 1½- to 2-ton trucks with hoist, and two pickup trucks. All the tillage equipment, drills, grain augers,

Table 11.—Number and proportion of farms by size and type in selected counties, Northern Plains, 1964

| Classification | Number of farms | Percent of farms |
|--|-----------------|------------------|
| Acres of cropland harvested per farm: | | |
| Less than 500 | 2,761 | 73.1 |
| 500 to 999 | 825 | 21.8 |
| 1,000 or more | 193 | 5.1 |
| Type of farm: | | |
| Field-crop farms, other than vegetable and fruit and nut | 2,968 | 78.5 |
| Cash-grain | 2,958 | 78.3 |
| Livestock farms, other than poultry and dairy | 470 | 12.4 |

Table 12.—Balance sheet, viable-size wheat-fallow farm,
Northern Plains, 1969

| Item | Operator | Landlord | Total operation |
|-----------------------------------|-----------|----------|-----------------|
| Assets: | | | |
| Land | \$85,860 | \$85,860 | \$171,720 |
| Machinery and equipment | 41,600 | — | 41,600 |
| Machine shed and shop | 3,500 | — | 3,500 |
| Grain storage buildings | 4,200 | 4,000 | 8,200 |
| Operating capital | 5,000 | — | 5,000 |
| Total assets | 140,160 | 89,860 | 230,020 |
| Liabilities: | | | |
| Real estate debt | 21,000 | — | 21,000 |
| Non-real-estate debt | 4,400 | — | 4,400 |
| Total liabilities | 25,400 | — | 25,400 |
| Net equity | \$114,760 | \$89,860 | \$204,620 |

welders, etc. are relatively new and/or in good shape, except for a few obsolete items.

Costs and returns pertaining to the crop harvested in 1969 are shown in table 13. The landlord owns some of the grain storage buildings and incurs some insurance and repair costs in connection with these buildings.

The hard red spring wheat produced in this area had a relatively high percentage of protein, and brought a substantial premium in price over ordinary protein wheat in 1969.

Partitioning Returns to Resources

It is assumed that the operator of this farm purchased the 6 quarter-sections of land he owns for \$45,000 in 1960. He contracted to pay 5-percent

interest on the unpaid balance and still owed \$21,000 in 1969. A sum of \$2,250 ($\$45,000 \times .05$) from the firm's 1969 returns was allocated as a return to investment in this land—\$1,200 on the operator's equity and \$1,050 to the exogenous investor.

A return to the operator's ownership in land consists of two components: An equivalent of the rental which the land could earn in 1969, and an allowance for the change in the land's value during the year. The rental rate was assumed to be the same as the net earned by the landlord on 6 quarter-sections of land in 1969—\$6,266 (see "landlord" column in table 13); change in the land value was based on an extension of the trend of land prices in the 1960's. There was an average annual increase in value of \$5.15 per acre during the decade. The combined figure for rental and land appreciation

Table 13.—Costs and returns, wheat-fallow study farm,
Northern Plains, 1969

| Item | Operator | Landlord | Total operation |
|--|----------|----------|-----------------|
| Gross income: | | | |
| Crop sales | \$29,788 | \$5,958 | \$35,746 |
| Domestic marketing certificates and price-support payments | 7,540 | 1,508 | 9,048 |
| Total income | 37,328 | 7,466 | 44,794 |
| Operating expenses: | | | |
| Seed purchases | 1,640 | — | 1,640 |
| Fuel oil and grease | 1,470 | — | 1,470 |
| Repairs and supplies | 3,330 | 210 | 3,540 |
| Herbicides and fertilizer | 1,060 | — | 1,060 |
| Hired labor | 375 | — | 375 |
| Insurance | 855 | 65 | 920 |
| Taxes | 1,215 | 775 | 1,990 |
| Miscellaneous costs | 720 | 150 | 870 |
| Total operating expenses | 10,665 | 1,200 | 11,865 |
| Returns to capital, entrepreneurship, and operator's labor | \$26,663 | \$6,266 | \$32,929 |

came to \$10,901. The net return to ownership in land was \$8,651.

The allowance made for depreciation on machinery, equipment, and buildings was \$4,656. The amount allocated as a return to nonland investments came to \$2,495 ($\$49,900 \times .05$). The exogenous investor received \$308 as interest on the \$4,400 debt.

A summary breakdown of returns to resources is given in table 14. The partitioning of returns left a residual of \$12,938 to compensate the operator's labor and entrepreneurship.

In contrast to the Pacific Northwest farm which had yields one-third below average in 1969, this farm had yields about a third above average. As a result of the higher yield, the Northern Plains farm showed a comparatively high ownership return to land. Also, land values during the sixties rose at a higher rate in the Northern Plains than in the other two areas studied.

Comparisons With 1968 and 1967

In 1968, the maximum acreage permitted in wheat under that year's program rules was considerably higher than in 1969. In addition to a 15-percent larger wheat allotment, the study farm could also substitute wheat on its entire acreage of barley-base and oat-rye base. The remaining 40 acres (short of 900 acres in crop) could then be planted to a crop in short supply, such as safflower.

In 1967, the allotment for wheat was about 700 acres, and the substitution rules were similar to 1968. Thus, in utilizing his total wheat allotment and substituting wheat for coarse grains, he was permitted to plant wheat on fully half his cropland acreage.

Wheat yields turned out about 13 percent below normal as an average for 1968 and 1967. Wheat prices averaged about 9 percent higher than in 1969, but marketing certificate receipts were 10 percent lower. Returns and costs were calculated based on 860 acres of wheat and 40 acres of safflower in 1968, and on 900 acres of wheat in 1967.

The net return to the landlord on his capital averaged less than \$5,000 per year—21 percent less than in 1969 because of poorer crops. As a return on his own capital, along with his labor and entrepreneurship, the operator received \$6,000 less than in 1969.

Partitioning the smaller return results in a 15-percent reduction from 1969 in net ownership return to the operator's land. The residual return to his labor and entrepreneurship was \$8,250—about 64 percent of the 1969 residual.

Supplementary Analysis

The operator of the study farm for the Northern Plains owns half and rents half the land he farms. As a full owner on this farm, his gross income would still come to about \$45,000 in 1969, providing the liabilities, investment, etc., remain the same. His share of land appreciation would double, and of course he would assume all the outlays formerly incurred by the landlord.

The return to investment in land would apply to all 3 sections of land, based on values and interest rates applicable to 1960. Return to operator's resources was about 43 percent higher than on the part-owned farm. When this amount is partitioned into components, the net return to land ownership

Table 14.—Gross income, operator's net return, and partitioning the operator's net return from a part-owned modern wheat-fallow farm, Northern Plains, 1969

| | | |
|--|---------------|---------------|
| Gross farm income | \$44,794 | |
| Add value appreciation on 6 quarter-sections of land | <u>4,635</u> | \$49,429 |
| Less share rent | | <u>7,466</u> |
| Gross income after rent deduction | | 41,963 |
| Less expenses: | | |
| Operating expenses as listed in table 13 | 10,665 | |
| Other charges to the farm business: | | |
| Interest on real estate debt ($\$21,000 \times .05$) | 1,050 | |
| Interest on non-real-estate debt ($\$4,400 \times .07$) | 308 | |
| Depreciation on machinery, equipment, and buildings | <u>4,656</u> | <u>16,679</u> |
| Return to operator's resources | | 25,284 |
| <i>Partitioning the Return to Operator's Resources</i> | | |
| Return to operator's investment in: | | |
| Land | 1,200 | |
| Machinery, equipment, and buildings | 2,245 | |
| Operating capital | 250 | |
| Net return to operator's ownership in land | 8,651 | |
| Return to operator's labor and entrepreneurship (residual) | <u>12,938</u> | 25,284 |

risers to \$17,302. The residual return to the full owner's labor and entrepreneurship was the same as that of the part owner. Analytic information on the fully owned farm is provided in table 15.

Poorer crops in 1968 and 1967 produced a smaller average return to the full owner's resources than he realized in 1969. The net return to land ownership comes to a sizable \$14,684 and the residual for operator's labor and entrepreneurship was the same as that of the part owner—\$8,250.

The full renter (zero ownership in land) would have no debt on real estate, but we continued to assume a \$4,400 debt on other assets. His 1969 gross income after rent deduction was nearly \$30,000. His return to operator's resources was about \$15,400. After deducting a return to investment in machinery, equipment, buildings, and operating capital, there remained a residual of \$12,938. Details of this

analysis are found in table 16.

The same full renter in an average 1968 and 1967 situation would have realized \$24,400 gross income per year after rent deduction. His return to operator's resources after deducting operating and capital expenses would have come to \$10,745. His return to operator's labor and entrepreneurship, after allocating \$2,495 to nonland investment, was \$8,250.

A summary showing returns to operator by crop year, land tenure, and resource component is given in table 17.

Central-Southern Plains. The largest U.S. wheat-growing region lies in a belt extending from eastern Wyoming-western Nebraska to northern Texas-eastern New Mexico (fig. 3). For the purpose of this study, the part in Wyoming, Nebraska, Colorado, and Kansas will be designated "Central Plains", with the term "Southern Plains" reserved for the part in Oklahoma,

Table 15.—Gross income, operator's net return, and partitioning the operator's net return from a fully owned modern wheat-fallow farm, Northern Plains, 1969

| | | |
|--|---------------|---------------|
| Gross farm income | | \$44,794 |
| Add value appreciation on 3 sections of land | | 9,270 |
| Gross income plus land appreciation | | <u>54,064</u> |
| Less expenses: | | |
| Operating expenses (see table 13) | \$11,865 | |
| Other charges to the farm business: | | |
| Interest on real estate debt | 1,050 | |
| Interest on non-real-estate debt | 308 | |
| Depreciation on machinery, equipment, and buildings | <u>4,656</u> | 17,879 |
| Return to operator's resources | | <u>36,185</u> |
| <i>Partitioning the Return to Operator's Resources</i> | | |
| Return to operator's investment in: | | |
| Land | 3,450 | |
| Machinery, equipment, and buildings | 2,245 | |
| Operating capital | 250 | |
| Net return to operator's ownership in land | 17,302 | |
| Return to operator's labor and entrepreneurship | <u>12,938</u> | 36,185 |

Table 16.—Gross income, operator's net return, and partitioning the operator's net return from a fully rented modern wheat-fallow farm, Northern Plains, 1969

| | | |
|--|---------------|---------------|
| Gross farm income | | 44,794 |
| Less share rent | | <u>14,932</u> |
| Gross income after rent deduction | | 29,862 |
| Less expenses: | | |
| Operating expenses (see table 13) | 9,465 | |
| Other charges to the farm business: | | |
| Interest on non-real-estate debt | 308 | |
| Depreciation on machinery, equipment, and buildings | <u>4,656</u> | 14,429 |
| Return to operator's resources | | <u>15,433</u> |
| <i>Partitioning the Return to Operator's Resources</i> | | |
| Return to operator's investment in: | | |
| Machinery, equipment, and buildings | 2,245 | |
| Operating capital | 250 | |
| Return to operator's labor and entrepreneurship | <u>12,938</u> | 15,433 |

Table 17.—Returns to operator of Northern Plains farm by crop year, land tenure, and resource component

| Crop year | Tenure in land | | | | | |
|-----------------------|---------------------------------------|------------------------------------|---------------------------------------|------------------------------------|--|------------------------------------|
| | Part owner Return to operator for— | | Full owner Return to operator for— | | Full renter Return to operator for— | |
| | Land ownership (net) | Labor and entrepre- neurship | Land ownership (net) | Labor and entrepre- neurship | Land ownership (net) | Labor and entrepre- neurship |
| | <i>Dollars</i> | | | | | |
| 1969 | 8,651 | 12,938 | 17,302 | 12,938 | — | 12,938 |
| 1967-68 average | 7,342 | 8,250 | 14,684 | 8,250 | — | 8,250 |

New Mexico, and Texas.¹² The study farm is in the 16- to 19-inch precipitation zone of the tri-State area of Nebraska-Colorado-Kansas.

Characteristics of this Central Plains farm are given in table 18. The conserving base is 22 percent smaller than that estimated for the Pacific Northwest farm and 4 percent smaller than on the Northern Plains farm. When minimum diverted acres under both the wheat and feed grain programs were added to the established conserving base, the total was still considerably short of 900 acres, which is half the cropland. In other words, half the cropland in fallow comprises more acres in conserving use than the minimum required in conserving uses under program rules; hence, there was no need for double summer fallowing.

To understand how the Central Plains farm compares with others in the 16- to 19-inch precipitation area, reference was made to the 1964 U.S. Census of Agriculture. The counties of Cheyenne, Deuel, and Perkins in Nebraska, plus Rawlins and Thomas Counties in Kansas were chosen to represent the desired tri-State (Nebraska-Colorado-Kansas) area. In these five counties, 3,035 farms cover an area of 3.05 million acres—60 percent in cropland; 39,000 acres were irrigated.

One million acres of crops were harvested in 1964 in the five counties. Each of 84 farms harvested 1,000 or more acres of this cropland. Another 490 farms harvested between 500 and 1,000 acres each. The Central Plains study farm would be included in this second classification of farm size. Table 19 gives a breakdown of the area farms by size and type of farm.

¹² The designations used in this study differ from those commonly used by the U.S. Department of Agriculture for grouping States into farming regions. The alternative designations put North Dakota, South Dakota, Nebraska, and Kansas in the Northern Plains; Oklahoma and Texas in the Southern Plains; Montana, Wyoming, Colorado, and New Mexico with the Mountain States.

Value of all farm products sold in the five counties in 1964 was somewhat over \$45 million, half of which was for field crops other than vegetables, fruits and nuts; 1,727 farms were classified "field crop farms other than vegetable and fruit and nut" and all but 11 of these were termed "cash grain" farms. Nearly \$22 million worth of sales were from livestock and livestock products other than poultry and dairy; 844 farms were classified "livestock farms other than poultry and dairy."

Crops in the tri-State area turned out somewhat better than average in 1969. Estimated yield of wheat for the Central Plains farm was 31 bushels per acre—about 11 percent above the projected long-term trend yield.

Alternative crops do poorly relative to winter wheat in this area, if confined to dryland; hence, we assumed that the operator would substitute wheat for feed grain to the full extent permitted. The operator seeded 660 acres to wheat and 240 acres to rye in the fall of 1968. The rye yielded an average of 25 bushels per acre.

A balance sheet of the study farm is given in table 20. Again, as was the case in the Northern Plains, the operator owns half the land and rents the rest. The operator owns all the equipment except \$4,000 worth of grain storage bins which belong to the landlord.

The machinery complement is similar to that which went with the Northern Plains farm, except for the combine. The Central Plains farm is equipped with a relatively old 14-foot self-propelled combine, in contrast to the relatively new 18-foot machine with which the other two farms were equipped. Two-thirds of the crop on this Central Plains farm was harvested by custom combiners.

Costs and returns in connection with the crop harvested in 1969 are listed in table 21. The outlay for 2-4-D herbicide and for fertilizer was only about one-third of the \$885 listed as paid out for pesticides and fertilizer; the remainder was spent on an opera-

Table 18.—Viable-size wheat-fallow farm, Central Plains, 1969

| Characteristic | Unit | Owned land | Rented land | Total operation |
|---|---------|------------|-------------|-----------------|
| Total acreage in farm | Acre | 960 | 960 | 1,920 |
| Cropland in farm | do. | 900 | 900 | 1,800 |
| Conserving base | do. | 345 | 345 | 690 |
| Wheat allotment | do. | 265 | 265 | 530 |
| Feed grain base | do | 80 | 80 | 160 |
| Oat-rye base | do. | 45 | 45 | 90 |
| Projected wheat yield | Bu./Ac. | 28 | 28 | 28 |
| Projected grain-sorghum yield | do. | 28 | 28 | 28 |

Table 19.—Number and proportion of farms by size and type, selected counties, Central Plains, 1964

| Classification | Number of farms | Percent of farms |
|--|-----------------|------------------|
| Acres of cropland harvested per farm: | | |
| Less than 500 | 2,343 | 80.3 |
| 500 to 999 | 490 | 16.8 |
| 1,000 or more | 84 | 2.9 |
| Type of farm: | | |
| Field-crop farms, other than vegetables and fruit and nuts | 1,727 | 59.2 |
| Cash grain | 1,716 | 58.8 |
| Livestock farms, other than poultry and dairy | 844 | 28.9 |

Table 20.—Balance sheet, viable-size wheat-fallow farm, Central Plains, 1969

| Item | Operator | Landlord | Total operation |
|-----------------------------------|----------------|----------------|-----------------|
| Assets: | | | |
| Land | \$113,400 | \$113,400 | \$226,800 |
| Machinery and equipment | 34,600 | — — — | 34,600 |
| Machine shed and shop | 3,500 | — — — | 3,500 |
| Grain storage buildings | 4,890 | 4,000 | 8,890 |
| Operating capital | 5,000 | — — — | 5,000 |
| Total assets | <u>161,390</u> | <u>117,400</u> | <u>278,790</u> |
| Liabilities: | | | |
| Real estate debt | 19,300 | — — — | 19,300 |
| Non-real-estate debt | 3,800 | — — — | 3,800 |
| Total liabilities | <u>23,100</u> | — — — | <u>23,100</u> |
| Net equity | \$138,290 | \$117,400 | \$255,690 |

tion to control the pale western cutworm, a cost which is not expected to recur in a typical subsequent year.

Partitioning Returns to Resources

The operator is assumed to have inherited 3 quarter-sections of land in 1952, and purchased the other 3 quarter-sections in 1962 for \$45,000. In 1969, he still owed \$19,300 on which he paid 5

percent interest. An investment return of \$1,296 ($\$32,400 \times .04$) was allocated to the inherited land, and \$1,285 ($\$25,700 \times .05$) was allocated to the operator's equity in the purchased land.

The net rental earned by the landlord on his 6 quarter-sections of land was \$4,780. An equivalent value is regarded as the rental component in calculating the operator's return to land ownership for his own 6 quarter-sections of land.

Table 21.—Costs and returns, wheat-fallow study farm,
Central Plains, 1969

| Item | Operator | Landlord | Total operation |
|---|--------------|--------------|-----------------|
| Gross income: | | | |
| Crop sales | \$24,428 | \$4,886 | \$29,314 |
| Domestic marketing certificates . | <u>8,083</u> | <u>1,616</u> | <u>9,699</u> |
| Total income | 32,511 | 6,502 | 39,013 |
| Operating expenses: | | | |
| Seed purchases | 1,020 | — | 1,020 |
| Fuel, oil and grease | 1,089 | — | 1,089 |
| Repairs and supplies | 3,090 | 180 | 3,270 |
| Pesticides and fertilizer | 885 | — | 885 |
| Hired combining and hauling . . . | 3,600 | — | 3,600 |
| Insurance | 1,015 | 60 | 1,075 |
| Taxes | 1,903 | 1,332 | 3,235 |
| Miscellaneous costs | <u>760</u> | <u>150</u> | <u>910</u> |
| Total operating expenses | 13,362 | 1,722 | 15,084 |
| Return to capital, entrepreneurship and operator's labor | \$19,149 | \$4,780 | \$23,929 |

A second component in land ownership return is the change in the land's value associated with the passage of 1 year. A least squares trend line was fitted to quoted land values in the 1960's, and the trend showed an average annual increase of \$3.28 per acre of improved land. If this trend is extended, we can associate a \$2,952 appreciation in connection with the operator's land. The net rent (\$4,780) plus increase in value (\$2,952) make up the operator's total return to land ownership. The total return less mortgage interest and return to investment left a net return of \$4,186.

The interest rate used in calculating an investment return on the equity in nonland assets was 5 percent. The business was charged \$2,209 to satisfy this return

to nonland investment. A charge of \$3,967 was allocated to a reserve for depreciation.

A summary of the returns to resources and partitioning is given in table 22. The return to the operator's resources was intermediate between the Pacific Northwest and the Northern Plains.

Comparisons With 1968 and 1967

As a participant in the 1968 program, the Central Plains operator could plant about 740 acres to wheat (610 acres on his wheat allotment, and 130 acres as a substitute on his permitted feed grain acres) and the remainder to rye. Or if he chose not to grow oats or

Table 22.—Gross income, operator's net return, and partitioning of the operator's net return from a modern part-owned wheat-fallow farm, Central Plains, 1969

| | | |
|--|--------------|---------------|
| Gross farm income | \$39,013 | |
| Add value appreciation on 6 quarter-sections of land | <u>2,952</u> | \$41,965 |
| Less share rent | | <u>6,502</u> |
| Gross income after rent deduction | | 35,463 |
| Less expenses: | | |
| Operating expenses as listed in table 21 | 13,362 | |
| Other charges to the farm business: | | |
| Interest on real estate debt (\$19,300 × .05) | 965 | |
| Interest on non-real-estate debt (\$3,800 × .07) | 266 | |
| Depreciation on machinery, equipment, and buildings . . . | <u>3,967</u> | <u>18,560</u> |
| Return to operator's resources | | 16,903 |
| <i>Partitioning the Return to Operator's Resources</i> | | |
| Return to operator's investment in: | | |
| Land (inherited, plus equity in purchased land) | 2,581 | |
| Machinery, equipment, and buildings | 1,959 | |
| Operating capital | 250 | |
| Net return to operator's ownership in land | 4,186 | |
| Return to operator's labor and entrepreneurship (residual) . . | <u>7,927</u> | 16,903 |

rye for harvest in 1968, he would be permitted to substitute wheat on his oat-rye base as well. The last arrangement would still leave 60 acres to be planted to some other permitted crop. In 1968, barley had not been designated a feed grain under the Voluntary Feed Grain Program and it could therefore be planted as a second crop along with the maximum permitted wheat acres.

Under the 1967 Program rules, it was possible to plant 900 acres to wheat. The operator in that year had a wheat allotment of 700 acres, and he could get the additional 200 acres needed by substituting wheat on his feed grain and oat-rye bases.

The average of 1968 and 1967 wheat yields in the five-county area was about 9 percent below the normal. Prices received for wheat were about 10 percent higher than in 1969, but because of a lower wheat parity price, receipts from marketing certificates were 10 percent lower. Returns and costs were based on 840 acres of wheat and 60 acres of barley in 1968, and on 900 acres of wheat in 1967.

The average of 1968 and 1967 operations produced a net return to the landlord on his 6 quarter-sections of some \$4,700—little different from his 1969 net return. The operator's return on his capital, labor, and entrepreneurship came to \$19,500, also very close to his 1969 return.

After allowing for capital charges, the return to operator's resources was about \$16,000. When this sum was partitioned, the net ownership return to land came to \$4,133. The residual left for the entrepreneur and his labor was \$8,384.

Again we assume the same size of wheat-growing operation, but with tenure status whereby the operator owns all the land in one case, and rents all the land in the other.

The debt position of the full owner is continued as that assumed earlier for the part owner. We also assume the same investments, including the purchase of a $\frac{3}{4}$ section in 1962 and inheritance of $2\frac{1}{4}$ sections in 1952. Land appreciation, now computed on 12 quarter-sections, comes to \$5,900 per year. The analysis in table 23 relates to the full owner's operations.

The return to the operator's resources in 1969 was \$24,635. When this sum was partitioned, the net ownership return to land of \$9,326 was more than double that for the part owner. As compensation for his labor and entrepreneurship, the full owner received \$7,927, the same as for the part owner, or tenant.

As an average for the 2 previous years, the full owner's return to his resources was only slightly higher than in 1969; his return to land ownership was \$100 less, and the residual to compensate his personal input was \$457 more than in 1969.

The operator who rents all his land has no real estate investment or debt. His non-real-estate debt is assumed to be the same as owed by the part owner or full owner.

After deductions for rent, production expenses, and charges for capital, the full renter's return to his resources was \$10,136 in 1969. The residual to pay for his own labor and management was \$7,927 (table 24).

Table 23.—Gross income, operator's net return, and partitioning of the operator's net return from a modern fully owned wheat-fallow farm, Central Plains, 1969

| | | |
|--|----------|----------|
| Gross farm income | | \$39,013 |
| Add value appreciation on 3 sections of land | | 5,904 |
| Gross income plus land appreciation | | 44,917 |
| Less expenses: | | |
| Operating expenses (see table 21) | \$15,084 | |
| Other charges to the farm business: | | |
| Interest on real estate debt | 965 | |
| Interest on non-real-estate debt | 266 | |
| Depreciation on machinery, equipment, and buildings | 3,967 | 20,282 |
| Return to operator's resources | | 24,635 |
| <i>Partitioning the Return to Operator's Resources</i> | | |
| Return to operator's investment in: | | |
| Land | | 5,173 |
| Machinery, equipment, and buildings | | 1,959 |
| Operating capital | | 250 |
| Net return to operator's ownership in land | | 9,326 |
| Return to operator's labor and entrepreneurship | | 7,927 |
| | | 24,635 |

Table 24.—Gross income, operator's net return, and partitioning of the operator's net return from a modern fully rented wheat-fallow farm, Central Plains, 1969

| | | |
|---|--------------|---------------|
| Gross farm income | | \$39,013 |
| Less share rent | | <u>13,004</u> |
| Gross income after rent deduction | | 26,009 |
| Less expenses: | | |
| Operating expenses (see table 21) | \$11,640 | |
| Other charges to the farm business: | | |
| Interest on non-real-estate debt | 266 | |
| Depreciation on machinery, equipment, and buildings | <u>3,967</u> | 15,873 |
| Return to operator's resources | | <u>10,136</u> |
| <i>Partitioning the Return to Operator's Resources</i> | | |
| Return to operator's investment in: | | |
| Machinery, equipment, and buildings | 1,959 | |
| Operating capital | 250 | |
| Return to operator's labor and entrepreneurship | <u>7,927</u> | 10,136 |

An average of 1968 and 1967 operations showed a return to the renter's resources of \$10,598. After allocating a return to his non-real-estate investment, there remained the sum of \$8,384 to pay for his labor

and management input.

A summary of returns to operator by crop year, land tenure, and resource component is given in table 25.

Table 25.—Returns to operator of Central Plains farm by crop year, land tenure, and resource component

| Crop year | Part owner Return to operator for— | | Tenure in land Full owner Return to operator for— | | Full renter Return to operator for— | |
|-----------------------|---------------------------------------|----------------------------|---|----------------------------|--|----------------------------|
| | Land ownership (net) | Labor and entrepreneurship | Land ownership (net) | Labor and entrepreneurship | Land ownership (net) | Labor and entrepreneurship |
| | <i>Dollars</i> | | | | | |
| 1969 | 4,186 | 7,927 | 9,326 | 7,927 | — | 7,927 |
| 1967-68 average | 4,133 | 8,384 | 9,220 | 8,384 | — | 8,384 |

COMPARISON OF NFT RETURNS

Allocations from financial returns were assigned to production factors other than the farm operator's own labor and management. The remaining net income from 1 year's operation was then ascribed to operator's labor and entrepreneurship. For the 3-year period 1967-69, the residual return to labor and entrepreneurship ranged from \$8,232 for a Central Plains operator to \$14,666 for a Pacific Northwest operator (table 26).

Returns to the operator's ownership in land were obtained by calculating a net rental for the land, then adding the increase in potential market value for this land. An investment return to land was then subtracted to obtain a net return to land ownership. The resulting net return ranged from 2.2 percent of the land's market value in the Pacific Northwest to 9.1

percent of the land's market value in the Northern Plains. The higher ownership return to land in the Northern Plains is attributed primarily to the greater rate of increase in land values, compared with the other two areas during the 1960's, although these values still are lower relative to earnings than in the Pacific Northwest or the Central Plains.

In this analysis, land taxes were included with other taxes and charged as an operating expense; the tax on land might have been charged directly against the return to land ownership. If the latter method of accounting were used, the return to operator for land ownership would decrease by the amount of land taxes, and the return to his labor and entrepreneurship would be increased by a like amount.



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Table 26.—Returns to operator as a function of region, crop year, land tenure, and resource component

| Region and crop year | Tenure in land | | | | | |
|---------------------------|---------------------------------------|----------------------------|---------------------------------------|----------------------------|--|----------------------------|
| | Part owner Return to operator for— | | Full owner Return to operator for— | | Full renter Return to operator for— | |
| | Land ownership (net) | Labor and entrepreneurship | Land ownership (net) | Labor and entrepreneurship | Land ownership (net) | Labor and entrepreneurship |
| | <i>Dollars</i> | | | | | |
| Pacific Northwest: | | | | | | |
| 1969 | 1,185 | 6,001 | 3,132 | 6,001 | — | 6,001 |
| 1967-68 average | 4,065 | 18,999 | 10,044 | 18,999 | — | 18,999 |
| 1967-69 average | 3,105 | 14,666 | 7,740 | 14,666 | — | 14,666 |
| Northern Plains: | | | | | | |
| 1969 | 8,651 | 12,938 | 17,302 | 12,938 | — | 12,938 |
| 1967-68 average | 7,342 | 8,250 | 14,684 | 8,250 | — | 8,250 |
| 1967-69 average | 7,778 | 9,813 | 15,557 | 9,813 | — | 9,813 |
| Central Plains: | | | | | | |
| 1969 | 4,186 | 7,927 | 9,326 | 7,927 | — | 7,927 |
| 1967-68 average | 4,133 | 8,384 | 9,220 | 8,384 | — | 8,384 |
| 1967-69 average | 4,151 | 8,232 | 9,255 | 8,232 | — | 8,232 |

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