

Potential
Long-Run Adjustments
for Oklahoma
Panhandle Farms

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Larry J. Connor* and Odell L. Walker**

This bulletin reports results of a study made to analyze what, how, how much, and when potential adjustments may occur in a specific agricultural area under different institutional, technical, and economic conditions. The study was made in the three counties of the Oklahoma Panhandle.

Objectives

The specific objectives of this study were:

- (1) To develop alternative adjustment hypotheses for farm operators;
- (2) To determine the minimum resource requirements (land, labor, and capital) and implied adjustments needed to obtain specified returns to operator labor and management under selected institutional, technical, and economic conditions;
- (3) To specify the combinations of farm enterprises consistent with the minimum resource estimates for specified income levels and environmental conditions;
- (4) To appraise the effects of changes in land prices (or returns to land), owned resources, and yield levels upon the minimum resource requirements and enterprise combinations determined in (2) and (3); and
- (5) To examine the implications of lower product prices and no allotments for the minimum resource requirements and enterprise combinations specified in (2) and (3).

Description of the Area

The geographic area to which this study applies is part of Oklahoma Economic Area 1 in western Oklahoma (14) which includes Beaver,

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Texas, and Cimarron counties. It is part of the soil classification area known as the High Plains and also includes part of the Rolling Red Plains in eastern Beaver County (3).

The two major soil groupings within the area are the loam soils (hardlands) and sandy lands. The Richfield clay loam and Dalhart sandy soils are two of the most common soils within the area. Soil fertility is generally adequate in the area, but natural rainfall is a limiting factor in production. Variation in precipitation is extreme from year to year as evidenced by historical data for the Oklahoma Panhandle (Figure 1).

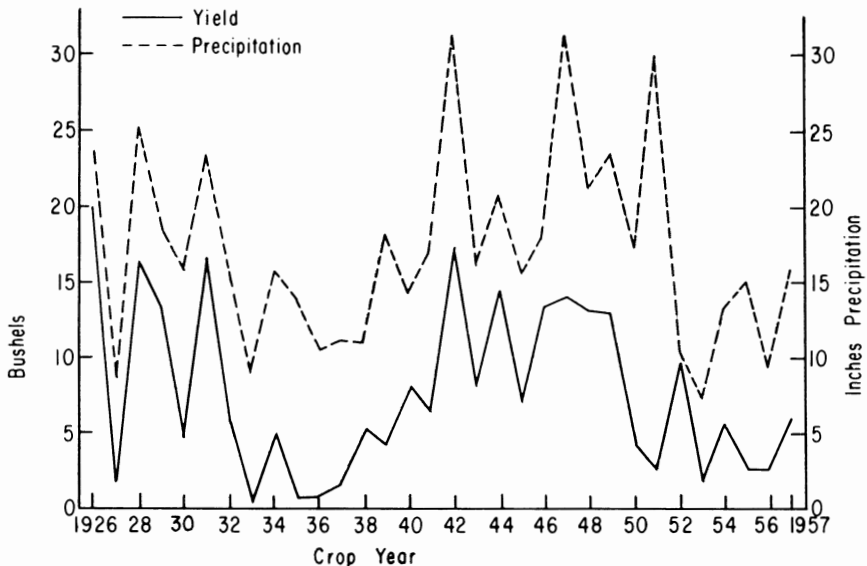


Figure 1. The average wheat production for Texas county, Oklahoma, in bushels per seeded acre in relation to the crop-year moisture.

Source: United States Department of Agriculture. *Soil Survey, Texas County, Oklahoma*. Soil Conservation Service in cooperation with Oklahoma Agricultural Experiment Station, Series 1958, No. 6 (Washington, 1961).

Long drought periods are common. With such a variation in precipitation, there is naturally a large fluctuation in yields of the major crops such as wheat (Figure 1). The percentage of seeded land abandoned before harvest is quite high during unfavorable years (Figure 2).

The period between killing frosts in the Panhandle is the shortest in Oklahoma, ranging from 180 to 190 days. The major crops are wheat on the hardlands and grain sorghums on the sandy lands. Some broom-corn is produced, and alfalfa is grown on some of the irrigated land. Soils unsuitable for cultivation and the various "breaks" are used mainly for ranching.

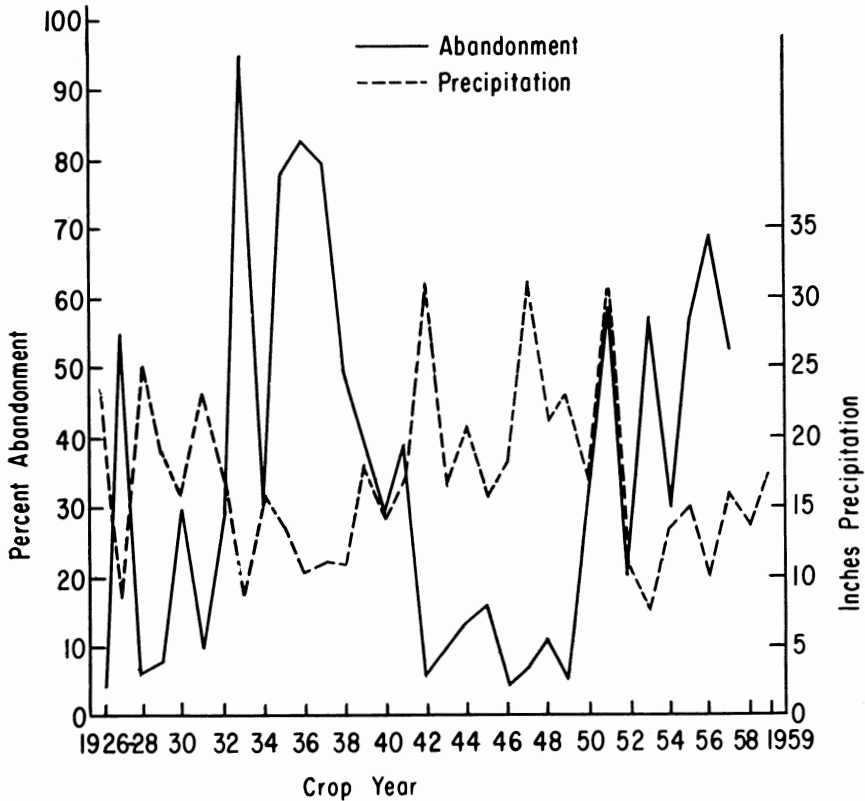


Figure 2. The percentage of seeded acres of wheat abandoned before harvest in Texas county, Oklahoma, in relation to crop-year moisture. Source: United States Department of Agriculture. *Soil Survey, Texas County Oklahoma*. Soil Conservation Service in cooperation with Oklahoma Agricultural Experiment Station, Series 1958, No. 6 (Washington, 1961).

The Panhandle is a farming area with no close metropolitan centers. Excluding agriculture, the major industry is production, transportation and processing of natural gas and oil. Most of the agricultural pre-harvest labor in the Panhandle is provided by the farm operator and his family. Some migratory labor is used for broomcorn. Wheat and grain sorghum, the two principal cash crops, are mainly harvested by custom combine crews.

Conceptual Development

A number of adjustments by farm operators in the long-run period is possible. Adjustments depend on farmer objectives and knowledge, technological and economic developments, and governmental programs.

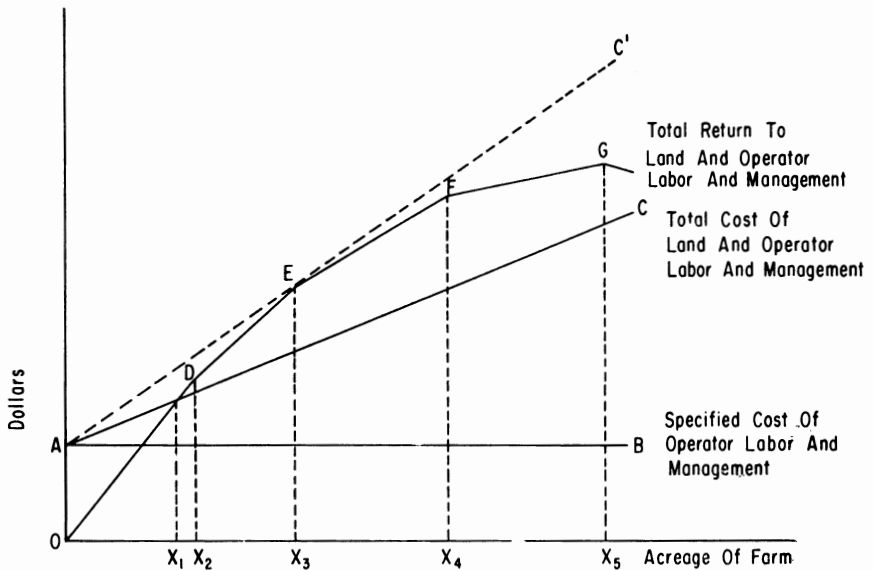


Figure 3. Hypothetical costs, returns, and alternative long-run adjustments in farm size in a minimum resource model.

A conceptual model illustrating various long-run adjustments is shown in Figure 3 (16). The line AB represents a specified return, OA, to operator labor and management. It may also be thought of as a cost, particularly as the "opportunity cost" of using labor and managerial talent in farming. The total land cost is added to this cost of operator labor and management to form AC, the total cost of land, and operator labor and management.

The kinked line, ODEFG, shows the total return to land and operator labor and management. It represents the returns remaining after hired labor, interest on nonland capital, and other cash costs have been paid. The kinks on this line may depict effects of various restrictions or resource indivisibilities on returns. For example, D might represent the point where the supply of operator labor is exhausted. All additional labor must be hired, so returns per acre will now be smaller and accordingly, there will be a kink on the revenue function. Similarly, point G might represent a hypothetical limit to management at which total returns begin to decrease.¹

Lumpy and discrete inputs, such as machinery, provide similar effects. Initial minimum sets of livestock equipment and machinery may

¹This assumes that there is a limit to the required management available in the area.

be required which are sufficient to handle some maximum acreage. Above these acreages, additional equipment is needed and more costs are incurred.² Points E and F may designate points where additional equipment is needed. If this is the case, ODEFG becomes a total return to land, operator labor, management, and owned equipment; and AB becomes a specified cost of operator labor and management, and owned or initial sets of equipment.

The solution to the long-run adjustment problem of determining the amounts of resources required to earn a specified labor and management return and to pay other costs—the “minimum resource adjustment” can be shown in Figure 3. The solution is where the total cost of land and operator labor and management, AC, intersects the total return, ODEFG. The minimum acreage required is OX_1 . At this point, all costs have been paid and a specified residual return is provided for operator labor and management. This size of farm may be regarded as the minimal long-run adjustment by farm operators.

The acreage (OX_1) is not the most profitable size of farm nor is it the equilibrium farm size as far as the area is concerned. The most profitable size of farm for product and input prices implied in Figure 3 would be OX_4 , where the difference between ODEFG and AC is the greatest. However, at OX_4 , profits are being made and new entrepreneurs would be attracted to farming. Since land is needed to obtain profits, competition would result and prices for the fixed supply of land would be expected to increase. Market forces would thus cause the total land cost to change and AC would shift upward to AC', reflecting higher land prices and rental rates. The point where AC' is just tangent to ODEFG would, therefore, represent the long-run equilibrium farm size, assuming prices of other factors or products do not change. This would be OX_3 in Figure 3.

Several alternative long-run adjustments can be formulated within the context of this “minimum resources” framework. For example, possible effects of owned resources, yield expectations, and the interaction of these items may be introduced.

Most farmers own some resources, such as land and machinery. An operator may be content with a plan that provides a specified minimum level of income to all owned resources (provided the owned resources remain in farming). The required size of farm, in acres, would be smaller than that required to provide a specified return to labor and management

²Above these points, the equipment costs per acre will be constant.

alone. This adjustment may be illustrated with reference to Figure 3. Since the total land cost would be less with this adjustment, line AC would have a smaller slope and intersect the total returns function, ODEFG, at a smaller total acreage.

Within the Oklahoma Panhandle, crop yields vary considerably from year to year because of erratic weather and climatic conditions. Hence, farmers naturally may have different expectations about potential yields. Some operators' yield anticipations may be the mathematical expectations for yields over time. However, others may be heavily influenced by "good" years and may not consider in their anticipations the years in which there are total crop failures. Thus, their yield expectations may be somewhat high. The effects of high expectations may be illustrated by referring again to Figure 3. Since the expected returns for any farm size is higher than before because of higher expected yields, ODEFG would intersect AC, the total land and labor cost, at a lower farm acreage. Thus, the long-run adjustment is once again different from that specified in the earlier "minimum resources" adjustment.

Procedures

Resource Situations

This study was confined to resource situations containing dryland cropland in the Oklahoma Panhandle. Irrigated cropland and pure range situations were excluded from the analysis. Physical resource situations were first identified on the basis of the major soils in the area. Since the major groupings are hardlands and sandy lands, resource situations were divided into clay loam and sandy situations. Each of these general resource situations was further divided according to the geographical locations, differences in productivity because of rainfall, and soil differences. Four resource situations were thus developed: Panhandle clay-loam, Eastern clay-loam, Cimarron sandy, and Eastern sandy (Table 1).

The clay-loam and sandy situations differ primarily in their respective locations. The Eastern clay-loam situation includes the clay-loam soils of Beaver County which resemble the soils found to the east in the Low Rolling Plains area of western Oklahoma. The Panhandle clay-loam situation includes the clay-loam soils which are located in the High Plains and are found in all three Panhandle counties. The Cimarron sandy resource situation includes the sandy soils found in Cimarron County and a limited acreage in Texas County (mostly Dalhart loamy fine sand soils). The Eastern sandy situation includes most of the sandy soils in Texas County and all in Beaver County.

Table 1. Estimated Acreage and Percentage of Each Soil Productivity Class, Total Cropland, Native Pasture, Total Farm Land, and Number of Farms by Resource Situations, Oklahoma Panhandle¹

Item	Resource Situation							
	Panhandle Clay Loam		Eastern Clay Loam		Cimarron Sandy		Eastern Sandy	
	(Acres)	(Percent)	(Acres)	(Percent)	(Acres)	(Percent)	(Acres)	(Percent)
Soil Productivity Class:								
a	60,111	4.4	0	0.0	0	0.0	156,974	56.3
b	647,653	47.1	0	0.0	78,356	54.3	0	0.0
c	231,984	16.7	76,721	20.4	39,458	27.3	0	0.0
d	215,760	15.7	106,931	28.5	--	--	--	--
Total Cropland ²	1,155,508	84.1	183,652	48.9	117,814	81.6	156,974	56.3
Native Pasture ³	175,868	12.8	179,521	47.8	22,090	15.3	112,363	40.3
Total Farm Land ⁴	1,373,969	100.0	375,566	100.0	144,380	100.0	278,817	100.0
Number of Farms ⁵	1,259	100.0	508	100.0	112	100.0	390	100.0

¹These estimates are based on Soil Survey Reports, SCS N-2 Soil Inventory Forms, ASC Records, and the 1959 Census of Agriculture. Irrigated cropland is excluded from these estimates as is land in range situations in the Panhandle.

²Total dryland cropland amounts to 1,613,948 acres.

³Total native pasture is 489,842 acres.

⁴Total farm land is 2,172,732 acres.

⁵Based upon 1959 Census and sample surveys. Estimated total number of dryland farms is 2,269.

Included Enterprises

A limited number of admissible production activities were considered in this analysis because of the restrictions imposed by the variable climate in the area, limited markets for specialized crops, and the finiteness of the operational model. Admissible crop enterprises for all situations were wheat, grain sorghum, forage sorghum, small grain grazing, forage sorghum grazing, and reseeding cropland to native grasses. Reseeding cropland was limited to productivity classes c and d for the clay loam resource situations.

Alternative livestock enterprises were limited to beef cow herds and selected feeder calf systems.

Operational Model

The minimum resources needed for specified income levels were estimated through the use of linear programming. One of the major questions concerning the operational model was what criterion to use for minimizing the resource requirements needed to attain the given income target. Any of three factors of production (land, labor, or capital) could be chosen for this purpose. The criterion equation selected for this study minimized the land requirement. Land was chosen as the factor to be minimized because of the following reasons:

- (1) Land was the critical factor in the conceptual model for this study;
- (2) Land prices are extremely difficult to estimate;
- (3) Land is a major factor of production in the agricultural sector;
- (4) Land is limited in quantity within a particular area;
- (5) The solutions obtained should be similar to those for a minimum capital criterion; and
- (6) Labor is not particularly limiting at the present time.

Land and Allotments

Total farmland, cropland, native pasture, and the distribution of cropland by productivity classes were determined for each resource situation. The model for this analysis was then constructed so that each acre of land for a specific situation contained this percentage distribution of cropland, pasture, and the productivity classes.

The approximate current wheat allotments were based upon A.S.C. records and a sample survey of farms. The total wheat allotments were then also expressed as a percentage of the total farmland. The percentage distributions of an acre of land for each of the four resource situa-

Table 2. The Percent of Each Land Productivity Class, Total Cropland, Wheat Allotment, and Native Pasture for One Acre of Land by Resource Situations, Oklahoma Panhandle, Used in the Model for This Study

Item	Resource Situation			
	Panhandle Clay Loam	Eastern Clay Loam	Cimarron Sandy	Eastern Sandy
	— Percent —			
Soil Productivity Class:				
a	3.50	0.00	0.00	45.04
b	37.71	0.00	43.42	0.00
c	13.50	16.34	21.86	0.00
d	12.56	22.78	--	--
Total Cropland ¹	67.27	39.12	65.28	45.04
Wheat Allotment	42.72	25.57	27.91	27.47
Native Pasture	12.80	47.80	15.30	40.30

¹A fallow, failure, or idle acreage of 20 percent of the total cropland is assumed.

tions are shown in Table 2. Of the total cropland, 20 percent was assumed to be nonharvested cropland. Survey data indicated that this acreage was usually fallow, failure or idle land.

Prices

The assumed prices paid and received by farmers in this study are shown in Appendix A, Tables 1 and 2. The prices received for wheat and grain sorghum are the approximate 1960-61 support prices, adjusted for the storage differential. Beef prices were based upon the approximate current price levels and adjusted for the commodity cycle. Resource prices used in this study are current prices obtained from farmers and agricultural workers in the area, and from an earlier farm survey in the Panhandle.

The land prices are based upon 1961-62 estimates for land transactions in the Panhandle. These estimates were obtained by comparing information on land sales with estimates by farm appraisers in the area, and other secondary sources. The land prices specified for each resource situation include values for service buildings, but exclude any value for either a dwelling or mineral rights. The land price for a specified situation is also a weighted average price which reflects the typical acre for that resource situation.

Capital

An interest charge of six percent per year was made for borrowing operating capital for purchasing feeders, machinery and various inputs. Capital borrowed for land investment was charged five percent per year. Capital requirements for various enterprises were divided into total and

annual capital. The model was then constructed to determine the minimum resource requirements and optimum enterprise combinations on the basis of the amount of total capital, but to charge interest only on annual capital.

Labor

One man-year of labor was assumed available in this analysis. The operator labor available for farm work was assumed to be 538 hours for the period of January through April, 506 hours during May through July, 352 hours in August and September, and 462 hours during October through December. The labor for these various periods allows a limited amount of time for work invested in managing the farm business.

Additional hourly labor could be hired in all months at a rate of \$1.25 per hour. Crops which are presently harvested on a custom basis were budgeted according to the 1962 custom rates in the area. Harvesting operations for wheat, grain sorghum, and forage sorghum were handled in this manner.

Technology and Management

This analysis assumes that improved technological and management levels are utilized within the Panhandle area. Presently, there is actually little difference between present and improved production practices (and technology).

Machinery

For this analysis, one 4-plow tractor and equipment set was assumed for farms with 900 acres or less of total cropland.³ For farms with more than 900 acres of cropland, the machinery investment was assumed to be a fixed amount per acre. The machinery assumption was thus determined by a trial and error process. If the initial programming results indicated that the income target could be reached with less than 900 acres of cropland, a one 4-plow tractor and equipment was assumed. For farms with more than 900 acres of cropland, the machinery investment was assumed to be a fixed amount per acre.

Overhead Costs

Many farm expenses cannot be allocated to a specific enterprise, and are, instead, whole farm costs. For this analysis, some of these ex-

³Walker, Odell L., *Machinery Combinations for Oklahoma Panhandle Grain Farms*, Agri. Expmt. Sta. Bul. B-630, Nov., 1964.

penses, or overhead costs, were assumed to be constant and other overhead costs were assumed to vary in relation to farm size. The constant whole farm overhead costs amounted to \$1,201. This figure includes the costs for shop tools, pickup truck and license, a butane storage tank, telephone, bookkeeping and tax service, and insurance on buildings and workers. (See Appendix B, Table 2).

The assumed per acre costs for other overhead items are shown by resource situations in Appendix B, Table 1. Some of the differences in the costs per acre among resource situations can be attributed to the different percentages of cropland.

Institutions

The commodity programs assumed for wheat and grain sorghum were those prevailing in 1960-62. As one phase of this analysis, however, a long-run situation was considered in which there were no price supports for wheat or grain sorghum, and no wheat allotments.

Income Targets

The average wage per employee in various selected industries is shown in Table 3 for the United States and Oklahoma for 1962. The average wages in Oklahoma ranged from \$6,301 for the petroleum products industry to \$2,641 for the apparel products industry.

The levels of income to operator labor and management assumed for this study were \$3,000 and \$5,000. These income levels represent the "equivalent" of semi-skilled and skilled labor in nonfarm occupations. The \$5,000 return also corresponds to the present average wage of nonfarm labor. No higher wage was assumed, although it might be argued that a level of income should have been selected to correspond to highly skilled labor. Also, nonfarm incomes can be expected to increase. However, farm labor might be handicapped when moving to non farm employments because of the lack of training. Thus, the incomes of these people may not increase so rapidly.

Results

Various long-run adjustments were examined separately in this analysis. With the owned resources hypothesis, 320 acres of land and one 4-plow tractor and machinery complement are assumed to be owned with no return required for them. The return in this instance becomes a return to operator owned resources. Under the adjustment associated

Table 3. Average Annual Earnings Per Full-Time Employee for Selected Industries in the United States and Oklahoma, 1962

Type of Industry	Average Annual Earnings	
	United States ¹	Oklahoma ²
	— Dollars —	
All Industries	5,013	³
Farming	1,623	³
Selected Industries		
Manufacturing:	5,715	4,692
Petroleum and Coal Products	7,404	6,301
Primary Metals	6,813	4,905
Machinery (except electrical)	6,456	4,641
Fabricated Metals	6,268	4,549
Printing and Publishing	5,890	5,142
Stone, Clay, and Glass Products	5,674	4,679
Food and Kindred Products	5,220	4,275
Lumber and Wood Products	4,080	3,385
Apparel Products	3,538	2,641
Wholesale Trade	6,372	4,738
Oil and Gas Mining	6,341	5,317
Contract Construction	5,890	5,620
Retail Trade	4,019	3,526

¹United States Department of Commerce, *Survey of Current Business*, Office of Business Economics (Washington, D.C., July, 1963).

²Oklahoma Employment Security Commission, Research and Planning Division, *Handbook of Oklahoma Employment Statistics, 1939-1962*, Oklahoma State Employment Service (Oklahoma City, March, 1963).

³Not available.

with different yield expectations, all yields for the various crops (except native pasture) were increased by 10 percent. Thus, these results may reflect different yield expectations, and also differences in productivity resulting from better management or differences in the physical resource endowment.

As one phase of this analysis, long-run prices of \$1.20 per bushel for wheat and \$1.65 per hundredweight for grain sorghum were assumed along with no wheat allotments. The same minimum resources framework was assumed as before except for the different product prices and the absence of wheat allotments.

The various long-run adjustments were determined with various land returns (or land prices) assumed. The minimum resource requirements associated with the 5 percent return might be regarded as those required by operators who are conscious of the opportunity costs of using resources in farming. The minimum requirements associated with the zero land returns represent those required by owner operators desiring a certain level of income after cash costs and depreciation have been paid.

Minimum Requirements for a \$3,000 Return

The estimated minimum land, capital, and labor requirements to obtain a \$3,000 return on the various resource situations are shown in Tables 4-6 for the alternative long-run adjustments analyzed in this study. Results in these tables are shown for various assumed land returns (or land prices). The complete programming results for the various long-run adjustments are shown in Appendices C-F.

With the "minimum resources" hypothesis, no solutions could be obtained on either the Eastern clay-loam or Cimarron sandy situations with a 5 percent return, and the requirements were quite high on the other resource situations. With no land return (or a zero land price), the requirements more nearly approximate current farm sizes. The minimum land requirement with no land return ranged from 670 acres on the Panhandle clay-loam situation to 1,379 acres on the Eastern clay-loam situation.

The introduction of "owned resources" substantially reduced the minimum land requirements with current land returns assumed (Table 4). However, solutions still could not be obtained on the Eastern clay-loam and Cimarron sandy situations. With no return to land assumed, the "owned resources" hypothesis resulted in slightly lower land requirements than was the case with the pure "minimum resources" hypothesis.

Introducing higher yields and/or "yield expectations" into the minimum resource model resulted in the lowest land requirements obtained (Table 4). However, a solution still could not be obtained for the Eastern clay-loam situation with a 5 percent return. The lowest land requirements were obtained when no return for land and higher yields were assumed. Only 575 acres were required in this case for the Panhandle clay-loam situation and a maximum acreage of 1,191 on the Eastern clay-loam situation.

An alternative situation involving long-run prices for wheat and grain sorghum and no allotments was also considered with the "minimum resources" hypothesis. A solution was obtained for only the Eastern sandy situation when the normal return of 5 percent was used. Compared to the "minimum resources" results obtained with the present price levels and allotments, the minimum land requirements were higher in every instance except for the Cimarron sandy situation when no return was assumed for land. Because of the more favorable initial position of grain sorghum and the change in the wheat-sorghum price ratio in favor of sorghum, the land requirement was reduced on this situation.

Table 4. Estimated Minimum Land Requirements to Obtain a \$3,000 Return on Specified Resource Situations With Alternative Long-Run Adjustments and Returns on Land Investment Assumed; Oklahoma Panhandle

Long-Run Adjustment and Assumed Land Return ¹	Resource Situation			
	Panhandle Clay Loam	Eastern Clay Loam	Cimarron Sandy	Eastern Sandy
	— Acres —			
<u>Minimum Resources²</u>				
5 percent return	5,014	No Solution	No Solution	2,783
3.75 percent return	1,542	No Solution	No Solution	1,491
2.5 percent return	985	3,438	3,297	1,160
0.0 percent return	670	1,379	1,356	822
<u>Minimum Resources with Owned Resources³</u>				
5 percent return	1,635	No Solution	No Solution	1,447
3.75 percent return	913	No Solution	13,214	1,127
2.5 percent return	776	2,321	2,422	963
0.0 percent return	632	1,301	1,272	776
<u>Minimum Resources with 10% Higher Yields⁴</u>				
5 percent return	1,496	No Solution	13,274	1,505
0.0 percent return	575	1,191	1,005	719
<u>Minimum Resources with No Price Supports or Allotment⁵</u>				
5 percent return	No Solution	No Solution	No Solution	9,900
0.0 percent return	909	1,799	1,170	902

¹The assumed land returns may also represent various land prices in a minimum resource model. For example, the solutions obtained with a 5 percent return are the same as those with land priced at 100 percent of the current price levels. The zero land return (or zero land price) may be interpreted as a full-owner situation where no return is required for the land factor.

²See Appendix Tables C-1—C-8 for farm organizations and other details of results.

³See Appendix Tables D-1—D-8 for farm organizations and other details of results.

⁴See Appendix Tables E-1—E-8 for farm organizations and other details of results.

⁵See Appendix Tables F-1—F-8 for farm organizations and other details of results.

Table 5. Estimated Minimum Capital Requirements to Obtain a \$3,000 Return on Specified Resource Situations With Alternative Long-Run Adjustments and Returns on Land Investment Assumed; Oklahoma Panhandle¹

Long-Run Adjustment and Assumed Land Return ¹	Resource Situation			
	Panhandle Clay Loam	Eastern Clay Loam	Cimarron Sandy	Eastern Sandy
	— Dollars —			
<u>Minimum Resources</u>				
5 percent return	599,085	No Solution	No Solution	256,799
3.75 percent return	183,353	No Solution	No Solution	137,858
2.5 percent return	117,465	270,432	241,530	107,798
0.0 percent return	81,782	110,443	99,644	78,798
<u>Minimum Resource with Owned Resources</u>				
5 percent return	194,477	No Solution	No Solution	133,605
3.75 percent return	108,980	No Solution	973,253	105,776
2.5 percent return	93,639	182,001	178,432	90,659
0.0 percent return	77,536	104,332	93,432	74,770
<u>Minimum Resources with 10% Higher Yields</u>				
5 percent return	179,150	No Solution	948,433	139,882
0.0 percent return	71,772	96,606	74,136	70,726
<u>Minimum Resources with No Price Supports or Allotments</u>				
5 percent return	No Solution	No Solution	No Solution	853,334
0.0 percent return	103,943	141,906	84,941	81,446

¹The assumed land returns may also represent various land prices in a minimum resource model. The zero land return may be interpreted as a full-owner situation where no return is required for the land factor.

Table 6. Estimated Minimum Labor Requirements to Obtain a \$3,000 Return on Specified Resource Situations With Alternative Long-Run Adjustments and Returns on Land Investment Assumed; Oklahoma Panhandle¹

Long-Run Adjustment and Assumed Land Return ²	Resource Situation			
	Panhandle Clay Loam	Eastern Clay Loam	Cimarron Sandy	Eastern Sandy
	— Hours —			
<u>Minimum Resources</u>				
5 percent return	5,457	No Solution	No Solution	2,671
3.75 percent return	1,678	No Solution	No Solution	1,430
2.5 percent return	1,088	2,540	3,688	1,112
0.0 percent return	758	1,228	1,462	788
<u>Minimum Resources with Owned Resources</u>				
5 percent returns	1,780	No Solution	No Solution	1,387
3.75 percent return	1,023	No Solution	14,777	1,082
2.5 percent return	876	1,715	2,615	923
0.0 percent return	715	1,158	1,372	744
<u>Minimum Resources with 10% High Yields</u>				
5 percent return	1,735	No Solution	15,227	1,479
0.0 percent return	668	1,077	1,130	746
<u>Minimum Resources with No Price Supports or Allotments</u>				
5 percent return	No Solution	No Solution	No Solution	10,049
0.0 percent return	1,014	1,442	1,440	970

¹The labor requirements include operator and hired labor, but exclude custom harvest labor.

²The assumed land returns may also represent various land prices in a minimum resource model. The zero land return may be interpreted as a full-owner situation where no return is required for the land factor.

The minimum capital and labor requirements associated with the various long-run adjustments varied almost proportionally with the different land returns assumed (Tables 5 and 6). This was to be expected because the land investment comprises the largest portion of the total capital requirement, and the labor requirement is determined mainly by land-based enterprises.

Minimum Requirements for a \$5,000 Return

The estimated minimum resource requirements to obtain a \$5,000 return on the various resource situations are shown in Tables 7-9 for the alternative long-run adjustments assumed in this study. The results again are based on various required levels of land return. The relationships between the adjustment hypotheses, and between resource situations, are approximately the same as with the \$3,000 return. However, the minimum resource requirements are naturally much larger. The complete programming results are shown in Appendices C-F.

Conclusions

A rough check on the appropriateness of each potential adjustment considered in this analysis is provided by current and historical adjustments and trends in farm size. For example, the average size of farms for the included farms in this study, as specified in Table 1, was 958 acres. The average farm size for the Panhandle increased from 862 acres in 1940, to 1,085 in 1950, and to 1,250 acres in 1960 (these census estimates include ranches).

Of the various adjustments considered in this study, the hypothesis that farmers acquire some minimum amounts of resources sufficient to obtain an acceptable return to labor and management does not appear to be an adequate explanation of this trend in farm sizes by itself. Different adjustments recognizing effects of owned resources, alternative yield expectations, and the interaction of these items all appear to provide more plausible explanations. For example, the programmed resource requirements for the "minimum resources" adjustment were extremely high with the present land return assumed, or no solutions could be obtained. The other adjustments provided more accurate estimates of the current trends in farm sizes.

The interaction of the "owned resources" and "yield expectations" hypotheses provides a possible explanation of financial or firm survival in the Panhandle region. For example, a beginning farmer might

Table 7. Estimated Minimum Land Requirements to Obtain a \$5,000 Return on Specified Resource Situations With Alternative Long-Run Adjustments and Returns on Land Investment Assumed; Oklahoma Panhandle

Long-Run Adjustment and Assumed Land Return ¹	Resource Situation			
	Panhandle Clay Loam	Eastern Clay Loam	Cimarron Sandy	Eastern Sandy
	— acres —			
<u>Minimum Resources²</u>				
5 percent return	10,927	No Solution	No Solution	5,379
3.75 percent return	2,563	No Solution	No Solution	2,435
2.5 percent return	1,565	6,551	5,759	1,663
0.0 percent return	923	1,938	2,134	1,132
<u>Minimum Resources with Owned Resources³</u>				
5 percent return	4,255	No Solution	No Solution	3,274
3.75 percent return	1,803	No Solution	40,269	1,866
2.5 percent return	1,253	4,913	4,180	1,420
0.0 percent return	884	1,827	2,002	1,086
<u>Minimum Resources with 10% High Yields⁴</u>				
5 percent return	2,486	No Solution	28,264	2,490
0.0 percent return	788	1,652	1,551	990
<u>Minimum Resources with No Price Supports or Allotments⁵</u>				
5 percent return	No Solution	No Solution	No Solution	19,636
0.0 percent return	1,083	3,114	1,842	1,291

¹The assumed land returns may also represent various land prices in a minimum resource model. The zero land return may be interpreted as a full-owner situation where no return is required for the land factor.

²See Appendix Tables C-1—C-8.

³See Appendix Tables D-1—D-8.

⁴See Appendix Tables E-1—E-8.

⁵See Appendix Tables F-1—F-8.

Table 8. Estimated Minimum Capital Requirements to Obtain a \$5,000 Return on Specified Resource Situations With Alternative Long-Run Adjustments and Returns on Land Investment Assumed; Oklahoma Panhandle

Long-Run Adjustment and Assumed Land Return ¹	Resource Situation			
	Panhandle Clay Loam	Eastern Clay Loam	Cimarron Sandy	Eastern Sandy
	— Dollars —			
<u>Minimum Resources</u>				
5 percent return	1,308,327	No Solution	No Solution	498,096
3.75 percent return	305,462	No Solution	No Solution	225,075
2.5 percent return	186,098	516,957	423,222	152,099
0.0 percent return	110,211	153,007	157,169	105,929
<u>Minimum Resources with Owned Resources</u>				
5 percent return	504,741	No Solution	No Solution	302,412
3.75 percent return	259,644	No Solution	2,970,684	172,183
2.5 percent return	148,786	387,202	306,503	130,524
0.0 percent return	105,725	144,474	147,407	101,900
<u>Minimum Resources with 10% High Yields</u>				
5 percent return	298,416	No Solution	2,011,100	231,530
0.0 percent return	95,819	131,990	113,865	94,801
<u>Minimum Resources with No Price Supports or Allotments</u>				
5 percent return	No Solution	No Solution	No Solution	1,694,494
0.0 percent return	129,860	246,394	134,077	113,889

¹The assumed land returns may also represent various land prices in a minimum resource model. The zero land return may be interpreted as a full-owner situation where no return is required for the land factor.

Table 9. Estimated Minimum Labor Requirements to Obtain a \$5,000 Return on Specified Resource Situations With Alternative Long-Run Adjustments and Returns on Land Investment Assumed; Oklahoma Panhandle¹

Long-Run Adjustment and Assumed Land Return ²	Resource Situation			
	Panhandle Clay Loam	Eastern Clay Loam	Cimarron Sandy	Eastern Sandy
	— Hours —			
<u>Minimum Resources</u>				
5 percent return	11,893	No Solution	No Solution	5,161
3.75 percent return	2,780	No Solution	No Solution	2,336
2.5 percent return	1,703	4,840	6,441	1,594
0.0 percent return	1,037	1,545	2,301	1,085
<u>Minimum Resources with Owned Resources</u>				
5 percent return	4,631	No Solution	No Solution	3,141
3.75 percent return	1,963	No Solution	45,034	1,790
2.5 percent return	1,363	3,630	4,674	1,363
0.0 percent return	1,001	1,518	2,159	1,042
<u>Minimum Resources with 10% High Yields</u>				
5 percent return	2,884	No Solution	32,518	2,447
0.0 percent return	917	1,454	1,745	1,028
<u>Minimum Resources with No Price Supports or Allotments</u>				
5 percent return	No Solution	No Solution	No Solution	19,930
0.0 percent return	1,208	2,497	2,267	1,388

¹The labor requirements include operator and hired labor, but exclude custom harvest labor.

²The assumed land returns may also represent various land prices on a minimum resource model. The zero land return may be interpreted as a full-owner situation where no return is required for the land factor.

luckily or shrewdly initiate his farming business at the first of a series of favorable crop years. His success could be manifest in substantial land and equipment equities. Should an unfavorable series of years then occur, his return to *all owned resources* might be sufficient for family needs and weathering the bad years, and possibly allow some additional land investment. Thus, the original high yield expectations combined with the unique decision criterion of obtaining acceptable returns from all resources might keep an individual farmer in business for a lifetime. Less fortunate farm firms would tend to quit business.

Based upon the results of this study, a number of developments appear likely in the Panhandle. The number of farms and farmers apparently will continue to decline because of the continued demand for the land resource to obtain units of the required size, and the tendency for equilization of earnings to labor and management in different sectors of the economy. Farm sizes can thus be expected to continue the upward trend.

The total acreages of the major crops considered apparently will not change significantly with the reductions in number of farms and farmers. The programming results for this study indicate that grain sorghum is most adapted to sandy farms, and wheat to the hardlands. The major livestock enterprises probably will continue to be various beef cattle systems, although buy-sell feeder systems utilizing pastures and locally produced forages may increase in importance.

Drastic changes in the price levels for wheat and grain sorghum can greatly influence the total returns of farm operators and their long-run adjustments, because of limited production alternatives in the Panhandle region. Large reductions in product prices would require more severe adjustments by those farmers who are most conscious of the opportunity costs of resources used in farming.

With adjustments in the number of farms and farmers, there will naturally be repercussions for agribusinesses, consumer or service businesses, local governments, schools, churches and other groups in the Panhandle. Although some agribusiness groups may survive and prosper, many businesses eventually may be forced to make spatial, size or organizational adjustments. All groups must consider location, trade volumes, size economies, and other such factors in making new capital investments. Thus, long-run agricultural adjustments are not simply "agricultural problems."

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Appendix A, Table 1
Assumed Prices Paid and Received by Farmers, Oklahoma Panhandle

Item	Unit	Price
		(Dollars)
<u>Prices Paid</u>		
Seed and Feed:		
Wheat Seed	Bu.	2.05
Grain Sorghum Seed	Cwt.	15.00
Forage Sorghum Seed	Cwt.	7.00
Clay Loam Land Grass Mixture Seed	Lb.	1.17
Sandy Land Grass Mixture Seed	Lb.	1.13
Cottonseed Cake	Ton	76.00
Salt	Cwt.	1.00
Custom Rates:		
Combining Wheat	Acre	3.00
Combining Grain Sorghum	Acre	2.50
Hauling Wheat and Grain	Bu.	.07
Binding Forage Sorghum	Acre	3.00
Shocking Forage Sorghum	Acre	1.00
Hauling and Stacking Forage Sorghum	Ton	1.50
Fuel and Lubricants:		
Gasoline	Gal.	.22
L. P. Gas	Gal.	.08
Motor Oil	Gal.	1.04
Lubricant	Lb.	.20
Labor	Hr.	1.25
Land: ¹		
Panhandle Clay Loam	Acre	100.00
Eastern Clay Loam	Acre	65.00
Cimarron Sandy	Acre	60.00
Eastern Sandy	Acre	75.00
<u>Prices Received</u>		
Wheat	Bu.	1.65 ²
Grain Sorghum	Cwt.	1.56 ²
Beef	Cwt.	³

¹Land price excludes values for minerals and dwelling.

²Approximate 1960-61 support prices adjusted for storage differential.

³See Appendix A, Table II.

Appendix A, Table 2
Assumed Prices for Calves, Steers and Cull Cows by Months, Oklahoma Panhandle¹

Class and Grade	Monthly Average												Yearly Average
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
	(Price Per Cwt.)												
<u>Calves</u>													
Good and Choice Steers, 500 lbs. and less	23.64	24.37	25.02	25.26	24.97	24.73	24.20	24.12	24.03	23.42	23.23	23.08	24.17
Heifers, 500 lbs. and less	21.64	22.37	23.02	23.26	22.97	22.73	22.20	22.12	22.03	21.42	21.23	21.08	22.17
<u>Steers</u>													
Good 500-800 lbs.	21.13	21.75	22.12	22.42	22.29	21.86	21.35	21.24	21.05	20.23	20.47	20.58	21.37
<u>Cows</u>													
Utility All weights	13.83	14.09	14.53	14.87	14.94	14.55	13.95	13.49	13.35	13.13	13.06	13.43	13.94

¹Approximate current price levels adjusted for commodity cycle.

Source: Blakley, Leo V., and Walker, Odell L., Unpublished Data, Department of Agricultural Economics, Oklahoma State University, 1962.

Appendix B, Table 1
Assumed Per Acre Overhead Cost Used in This Study by Resource
Situations, Oklahoma Panhandle¹

Item	Panhandle Clay Loam	Eastern Clay Loam	Cimarron Sandy	Eastern Sandy
	(Dollars)			
Interest on Land	5.00	3.25	3.00	3.75
Land Tax ²	.78	.55	.76	.60
Nonharvested Cropland Cost ³	.22	.13	.21	.15
Building Depreciation and Maintenance	.15	.09	.14	.10
Livestock Equipment Depreciation and Maintenance	.41	.41	.41	.41
Machinery Overhead Costs	.96	.56	.94	.65
Total Overhead Cost Per Acre	7.52	4.99	5.46	5.66

¹Whole farm overhead costs, as shown in Appendix B, Table 2 amount to \$1,201.

²Assumes \$.88 per acre of cropland and \$.24 per acre of pasture and other land. Hall, et al.

³Includes cost of fallow, abandoned crops, etc.

Appendix B, Table 2
Assumed Whole Farm Overhead Costs, Oklahoma Panhandle

Item	Investment	Annual Cost
	(Dollars)	
A. Machinery Fixed Costs:		
Shop Tools	270	50
Pick-up Truck, ½ ton	1,230	--
Interest on Investment	--	75
Depreciation	--	305
Gas, Oil, and Lubrication	--	405
Repairs	--	105
Insurance (Liability only)	--	25
Butane Storage Tank (500 gal.)	155	8
B. Taxes:		
Pick-up Truck (License)	--	13
C. Miscellaneous:		
Telephone	--	75
Bookkeeping and Tax Service	--	40
Insurance on Buildings and Workers	--	100
Total Specified Overhead Costs	1,655	1,201

Source: Hall, et al.

Appendix C, Table 1
Estimated Minimum Requirements for \$3,000 Return to Operator Labor
and Management With Specified Land Returns, No Owned Land or
Machinery Complement, Panhandle Clay Loam Situation,
Oklahoma Panhandle

Item	Unit	Land Return (Percent) ¹			
		5.0	3.75	2.5	0.0
Total Land	Acres	5,014	1,542	985	670
Cropland	Acres	4,217	1,297	828	563
Wheat	Acres	2,142	659	421	286
Grain Sorghum	Acres	483	149	92	84
Forage Sorghum	Acres	118	36	26	20
Grazed Out Small Grain	Acres	450	139	89	60
Reseeded Cropland	Acres	179	55	35	0
Cows	Animal	22	7	5	2
Feeders	Animal	434	134	85	58
Operator Labor	Hour	1,858	1,289	1,088	758
Hired Labor	Hour	3,599	389	0	0
Investment					
Land and Buildings	Dollars	508,921	156,513	100,100	68,600
Machinery	Dollars	24,719	7,602	5,240	5,240
Total Operating Capital	Dollars	65,445	19,238	12,125	7,942
Total Capital Requirement ²	Dollars	599,085	183,353	117,465	81,782
Gross Income	Dollars	119,344	36,717	23,481	16,086
Operating and Overhead Expense	Dollars	85,461	26,454	17,024	12,092
Return to Land	Dollars	25,070	5,783	2,463	0
Machinery Fixed Costs	Dollars	4,813	1,480	994	994
Return to Operator Labor and Management ³	Dollars	4,414	3,408	3,252	3,171

¹Percent of the investment in land.

²In a minimum resource model, variations in land prices at a constant rate of return correspond to variations in land returns at a constant land price. However, total capital requirements would differ. In these solutions, land prices of \$100, \$75, \$50, and 0 and a land return of 5 percent correspond to land returns of 5, 3.75, 2.5, and 0 percent respectively with land at the current price of \$100 per acre. With land prices of \$100 and \$75 per acre, and a 5 percent land return, capital requirements would be \$599,085 and \$144,803, respectively.

³Returns exceed \$3,000 because of the adjustment for the difference between the interest on total operating capital and the interest on annual operating capital.

Appendix C, Table 2
Estimated Minimum Requirements for \$5,000 Return to Operator Labor
and Management With Specified Land Returns, No Owned Land or
Machinery Complement, Panhandle Clay Loam Situation,
Oklahoma Panhandle

Item	Unit	Land Return (Percent) ¹			
		5.0	3.75	2.5	0.0
Total Land	Acres	10,927	2,563	1,565	923
Cropland	Acres	9,190	2,155	1,316	776
Wheat	Acres	4,668	1,095	668	394
Grain Sorghum	Acres	1,053	247	151	106
Forage Sorghum	Acres	257	60	37	28
Grazed Out Small Grain	Acres	982	230	141	83
Reseeded Cropland	Acres	391	92	56	10
Cows	Animal	48	11	7	3
Feeders	Animal	947	222	136	80
Operator Labor	Hour	1,858	1,565	1,295	1,037
Hired Labor	Hour	10,035	1,215	408	0
Investment					
Land and Buildings	Dollars	1,109,091	260,145	158,848	93,900
Machinery	Dollars	53,870	12,636	7,715	5,240
Total Operating Capital	Dollars	145,366	32,681	19,535	11,071
Total Capital Requirement ²	Dollars	1,308,327	305,462	186,098	110,211
Gross Income	Dollars	260,090	61,020	37,255	22,119
Operating and Overhead Expense	Dollars	189,965	43,949	26,840	16,125
Return to Land	Dollars	54,635	9,611	3,913	0
Machinery Fixed Costs	Dollars	10,490	2,460	1,502	994
Return to Operator Labor and Management ³	Dollars	8,162	5,700	5,415	5,236

¹Percent of the investment in land.

²In a minimum resource model, variations in land prices at a constant rate of return correspond to variations in land returns at a constant land price. However, total capital requirements would differ. In these solutions land prices of \$100, \$75, \$50, and 0, and a land return of 5 percent correspond to land returns of 5, 3.75, 2.5, and 0 percent respectively with land at the current price of \$100 per acre. With land prices of \$100 and \$75 per acre, and a 5 percent land return, capital requirements would be \$1,308,327 and \$241,387, respectively.

³Returns exceed \$5,000 because of the adjustment for the difference between the interest on total operating capital and the interest on annual operating capital.

Appendix C, Table 3
Estimated Minimum Requirements for \$3,000 Return to Operator Labor
and Management With Specified Land Returns, No Owned Land or
Machinery Complement, Eastern Clay Loam Situation,
Oklahoma Panhandle

Item	Unit	Land Return (Percent) ¹			
		5.0	3.75	2.5	0.0
Total Land	Acres			3,438	1,379
Cropland	Acres			1,681	674
Wheat	Acres			879	353
Grain Sorghum	Acres			0	91
Forage Sorghum	Acres			55	42
Grazed Out Small Grain	Acres			133	53
Reseeded Cropland	Acres			278	0
Cows	Animal			83	32
Feeders	Animal			129	52
Operator Labor	Hour	No Solution	No Solution	1,674	1,228
Hired Labor	Hour			866	0
Investment					
Land and Buildings	Dollars	No Solution	No Solution	224,742	91,235
Machinery	Dollars			9,867	5,240
Total Operating Capital	Dollars			35,823	13,968
Total Capital Requirement ²	Dollars			270,432	110,443
Gross Income	Dollars			41,505	17,339
Operating and Overhead Expense	Dollars			30,993	13,345
Return to Land	Dollars			5,587	0
Machinery Fixed Costs	Dollars			1,925	994
Return to Operator Labor and Management ³	Dollars			3,432	3,162

¹Percent of the investment in land.

²In a minimum resource model, variations in land prices at a constant rate of return correspond to variations in land returns at a constant land price. However, total capital requirements would differ. In these solutions, land prices of \$65, \$49, \$33, and 0 and a land return of 5 percent correspond to land returns of 5, 3.75, 2.5, and 0 percent respectively with land at the current price of \$65 per acre.

³Returns exceed \$3,000 because of the adjustment for the difference between the interest on total operating capital and the interest on annual operating capital.

Appendix C, Table 4
Estimated Minimum Requirements for \$5,000 Return to Operator Labor
and Management With Specified Land Returns, No Owned Land or
Machinery Complement, Eastern Clay Loam Situation,
Oklahoma Panhandle

Item	Unit	Land Return (Percent) ¹			
		5.0	3.75	2.5	0.0
Total Land	Acres			6,551	1,938
Cropland	Acres			3,203	948
Wheat	Acres			1,675	496
Grain Sorghum	Acres			0	28
Forage Sorghum	Acres			104	46
Grazed Out Small Grain	Acres			254	75
Reseeded Cropland	Acres			529	113
Cows	Animal			159	48
Feeders	Animal			245	73
Operator Labor	Hour			1,858	1,545
Hired Labor	Hour			2,982	0
Investment					
Land and Buildings	Dollars	No Solution	No Solution	428,239	127,656
Machinery	Dollars			18,801	5,562
Total Operating Capital	Dollars			69,917	19,789
Total Capital Requirement ²	Dollars			516,957	153,007
Gross Income	Dollars			79,073	23,742
Operating and Overhead Expense	Dollars			59,474	17,657
Return to Land	Dollars			10,930	0
Machinery Fixed Costs	Dollars			3,669	1,085
Return to Operator Labor and Management ³	Dollars			5,872	5,226

¹Percent of the investment in land.

²In a minimum resource model, variations in land prices at a constant rate of return correspond to variations in land returns at a constant land price. However, total capital requirements would differ. In these solutions, land prices of \$65, \$49, \$33, and 0 and a land return of 5 percent correspond to land returns of 5, 3.75, 2.5, and 0 percent respectively with land at the current price of \$65 per acre.

³Returns exceed \$5,000 because of the adjustment for the difference between the interest on total operating capital and the interest on annual operating capital.

Appendix C, Table 5
Estimated Minimum Requirements for \$3,000 Return to Operator Labor
and Management With Specified Land Returns, No Owned Land or
Machinery Complement, Cimarron Sandy Situation,
Oklahoma Panhandle

Item	Unit	Land Return (Percent) ¹			
		5.0	3.75	2.5	0.0
Total Land	Acres			3,297	1,356
Cropland	Acres			2,690	1,106
Wheat	Acres			535	290
Grain Sorghum	Acres			1,512	541
Forage Sorghum	Acres			8	1
Grazed Out Small Grain	Acres			97	53
Reseeded Cropland	Acres			0	0
Cows	Animal			24	7
Feeders	Animal			90	49
Operator Labor	Hour			1,511	951
Hired Labor	Hour			2,175	511
Investment					
Land and Buildings	Dollars	No Solution	No Solution	202,601	83,326
Machinery	Dollars			15,760	6,482
Total Operating Capital	Dollars			23,169	9,836
Total Capital Requirement ²	Dollars			241,530	99,644
Gross Income	Dollars			45,174	19,773
Operating and Overhead Expense	Dollars			34,129	15,498
Return to land	Dollars			4,946	0
Machinery Fixed Costs	Dollars			3,099	1,275
Return to Operator Labor and Management ³	Dollars			3,377	3,174

¹Percent of the investment in land.

²In a minimum resource model, variations in land prices at a constant rate of return correspond to variations in land returns at a constant land price. However, total capital requirements differ. In these solutions, land prices of \$60, \$45, \$30, and 0 and a land return of 5 percent correspond to land returns of 5, 3.75, 2.5 and 0 percent respectively with land at the current price of \$60 per acre.

³Returns exceed \$3,000 because of the adjustment for the difference between the interest on total operating capital and the interest on annual operating capital.

Appendix C, Table 6
Estimated Minimum Requirements for \$5,000 Return to Operator Labor
and Management With Specified Land Returns, No Owned Land or
Machinery Complement, Cimarron Sandy Situation,
Oklahoma Panhandle

Item	Unit	Land Return (Percent) ¹			
		5.0	3.75	2.5	0.0
Total Land	Acres			5,759	2,134
Cropland	Acres			4,699	1,741
Wheat	Acres			934	457
Grain Sorghum	Acres			2,642	852
Forage Sorghum	Acres			14	1
Grazed Out Small Grain	Acres			170	83
Reseeded Cropland	Acres			0	0
Cows	Animal			42	12
Feeders	Animal			158	77
Operator Labor	Hour			1,805	1,207
Hired Labor	Hour			4,636	1,094
Investment					
Land and Buildings	Dollars			354,179	131,134
Machinery	Dollars			27,528	10,201
Total Operating Capital	Dollars			41,515	15,834
Total Capital Requirement ²	Dollars			423,222	157,169
Gross Income	Dollars			78,912	31,104
Operating and Overhead Expense	Dollars			59,860	24,098
Return to Land	Dollars			8,639	0
Machinery Fixed Costs	Dollars			5,413	2,006
Return to Operator Labor and Management ³	Dollars			5,689	5,284

¹Percent of the investment in land.

²In a minimum resource model, variations in land prices at a constant rate of return correspond to variations in land returns at a constant land price. However, total capital requirements would differ. In these solutions, land prices of \$60, \$45, \$30, and 0 and a land return of 5 percent correspond to land returns of 5, 3.75, 2.5, and 0 percent respectively with land at the current price of \$60 per acre.

³Returns exceed \$5,000 because of the adjustment for the difference between the interest on total operating capital and the interest on annual operating capital.

Appendix C, Table 7
Estimated Minimum Requirements for \$3,000 Return to Operator Labor
and Management With Specified Land Returns, No Owned Land or
Machinery Complement, Eastern Sandy Situation,
Oklahoma Panhandle

Item	Unit	Land Return (Percent) ¹			
		5.0	3.75	2.5	0.0
Total Land	Acres	2,783	1,491	1,160	822
Cropland	Acres	1,567	839	653	463
Wheat	Acres	765	410	319	226
Grain Sorghum	Acres	246	132	103	73
Forage Sorghum	Acres	34	18	14	10
Grazed Out Small Grain	Acres	209	112	87	62
Reseeded Cropland	Acres	0	0	0	0
Cows	Animal	42	23	18	13
Feeders	Animal	209	112	87	62
Operator Labor	Hour	1,695	1,331	1,112	788
Hired Labor	Hour	976	99	0	0
Investment					
Land and Buildings	Dollars	211,508	113,798	88,020	63,250
Machinery	Dollars	9,184	5,240	5,240	5,240
Total Operating Capital	Dollars	36,107	18,820	14,538	10,308
Total Capital Requirement ²	Dollars	256,799	137,858	107,798	78,798
Gross Income	Dollars	55,347	29,659	23,064	16,355
Operating and Overhead Expense	Dollars	40,102	21,472	16,895	12,361
Return to Land	Dollars	10,436	4,193	2,175	0
Machinery Fixed Costs	Dollars	1,809	994	994	994
Return to Operator Labor and Management ³	Dollars	3,655	3,335	3,258	3,183

¹Percent of the investment in land.

²In a minimum resource model, variations in land prices at a constant rate of return correspond to variations in land returns at a constant land price. However, total capital requirements would differ. In these solutions, land prices of \$75, \$56, \$38 and 0 and a land return of 5 percent correspond to land returns of 5, 3.75, 2.5, and 0 percent respectively with land at the current price of \$75 per acre. With land prices of \$75 and \$56 per acre, and a 5 percent land return, capital requirements would be \$256,799 and \$109,529.

³Returns exceed \$3,000 because of the adjustment for the difference between the interest on total operating capital and the interest on annual operating capital.

Appendix C, Table 8
Estimated Minimum Requirements for \$5,000 Return to Operator Labor
and Management With Specified Land Returns, No Owned Land or
Machinery Complement, Eastern Sandy Situation,
Oklahoma Panhandle

Item	Unit	Land Return (Percent) ¹			
		5.0	3.75	2.5	0.0
Total Land	Acres	5,379	2,435	1,663	1,132
Cropland	Acres	3,028	1,371	936	637
Wheat	Acres	1,478	669	457	311
Grain Sorghum	Acres	476	215	147	100
Forage Sorghum	Acres	67	30	21	14
Grazed Out Small Grain	Acres	403	182	125	85
Reseeded Cropland	Acres	0	0	0	0
Cows	Animal	82	37	25	17
Feeders	Animal	403	183	125	85
Operator Labor	Hour	1,858	1,657	1,425	1,085
Hired Labor	Hour	3,303	679	169	0
Investment					
Land and Buildings	Dollars	408,804	185,669	125,557	86,500
Machinery	Dollars	17,751	8,036	5,488	5,240
Total Operating Capital	Dollars	71,541	31,370	21,054	14,189
Total Capital Requirement ²	Dollars	498,096	225,075	152,099	105,929
Gross Income	Dollars	106,948	48,422	33,066	22,512
Operating and Overhead					
Expense	Dollars	78,281	34,991	23,867	16,518
Return to Land	Dollars	20,171	6,848	3,118	0
Machinery Fixed Costs	Dollars	3,496	1,583	1,081	994
Return to Operator Labor and Management ³	Dollars	6,319	5,567	5,376	5,252

¹Percent of the investment in land.

²In a minimum resource model, variations in land prices at a constant rate of return correspond to variations in land returns at a constant land price. However, total capital requirements would differ. In these solutions, land prices of \$75, \$56, \$38, and 0 and a land return of 5 percent correspond to land returns of 5, 3.75, 2.5, and 0 percent respectively with land at the current price of \$75 per acre. With land prices of \$75 and \$56 per acre, and a 5 percent land return, capital requirements would be \$498,096 and \$178,810 respectively.

³Returns exceed \$5,000 because of the adjustment for the difference between the interest on total operating capital and the interest on annual operating capital.

Appendix D, Table 1**Estimated Minimum Requirements for \$3,000 Return to Operator Owned Resources With Specified Land Returns, Panhandle Clay Loam Situation, Oklahoma Panhandle**

Item	Unit	Land Return (Percent) ¹			
		5.0	3.75	2.5	0.0
Total Land	Acres	1,635	913	776	632
Cropland	Acres	1,375	768	653	532
Wheat	Acres	699	390	331	270
Grain Sorghum	Acres	158	109	97	79
Forage Sorghum	Acres	38	27	26	19
Grazed Out Small Grain	Acres	147	82	70	57
Reseeded Cropland	Acres	58	6	0	0
Cows	Animals	7	3	2	2
Feeders	Animals	142	79	67	55
Operator Labor	Hours	1,315	1,023	876	715
Hired Labor	Hours	465	0	0	0
Investment					
Land and Buildings	Dollars	165,953	92,900	79,200	64,800
Machinery	Dollars	8,061	5,240	5,240	5,240
Total Operating Capital	Dollars	20,463	10,840	9,199	7,496
Total Capital Requirement ²	Dollars	194,477	108,980	93,639	77,536
Gross Income	Dollars	38,932	21,885	18,634	15,183
Operating and Overhead Expense	Dollars	28,049	15,965	13,798	11,487
Returns to Nonowned Land	Dollars	6,575	2,224	1,140	0
Machinery Fixed Costs	Dollars	1,308	696	696	696
Returns to Operator Owned Resources ³	Dollars	3,435	3,233	3,198	3,162

¹Percent of the investment in nonowned land.

²In a minimum resource model, variations in land prices at a constant rate of return correspond to variations in land returns at a constant land price. However, total capital requirements would differ. In these solutions, land prices of \$100, \$75, \$50, and 0 and a land return of 5 percent correspond to land returns of 5, 3.75, 2.5, and 0 percent respectively with land at the current price of \$100 per acre. With land prices of \$100 and \$75 per acre, and a 5 percent land return, capital requirements would be \$194,477 and \$86,155 respectively.

³Returns to operator labor and management, 320 acres of land, and one 4-plow tractor and machinery complement. Returns exceed \$3,000 because of the adjustment for the difference between the interest on total operating capital and the interest on annual operating capital.

Appendix D, Table 2
Estimated Minimum Requirements for \$5,000 Return to Operator Owned Resources With Specified Land Returns, Panhandle Clay Loam Situation, Oklahoma Panhandle

Item	Unit	Land Return (Percent) ¹			
		5.0	3.75	2.5	0.0
Total Land	Acres	4,255	1,803	1,253	884
Cropland	Acres	3,578	1,516	1,054	743
Wheat	Acres	1,818	770	535	378
Grain Sorghum	Acres	410	174	121	111
Forage Sorghum	Acres	100	42	29	27
Grazed Out Small Grain	Acres	382	162	113	80
Reseeded Cropland	Acres	152	64	45	0
Cows	Animals	19	8	5	3
Feeders	Animals	369	156	109	77
Operator Labor	Hours	1,839	1,362	1,208	1,001
Hired Labor	Hours	2,792	601	155	0
Investment					
Land and Buildings	Dollars	431,883	228,080	127,180	90,000
Machinery	Dollars	17,640	8,889	6,177	5,240
Total Operating Capital	Dollars	55,218	22,675	15,429	10,485
Total Capital Requirement ²	Dollars	504,741	259,644	148,786	105,725
Gross Income	Dollars	101,292	42,931	29,832	21,239
Operating and Overhead Expense	Dollars	73,213	29,074	21,497	15,543
Returns to Nonowned Land	Dollars	19,675	7,415	2,333	0
Machinery Fixed Costs	Dollars	3,404	1,442	1,002	696
Returns to Operator Owned Resources ³	Dollars	6,190	5,483	5,326	5,226

¹Percent of the investment in nonowned Land.

²In a minimum resource model, variations in land prices at a constant rate of return correspond to variations in land returns at a constant land price. However, total capital requirements would differ. In these solutions, land prices of \$100, \$75, \$50 and 0 and a land return of 5 percent correspond to land returns of 5, 3.75, 2.5, and 0 percent respectively with land at the current price of \$100 per acre. With land prices of \$100 and \$75 per acre, and a 5 percent land return, capital requirements would be \$504,741 and \$214,569 respectively.

³Returns to operator labor and management, 320 acres of land, and one 4-plow tractor and machinery complement. Returns exceed \$5,000 because of the adjustment for the difference between the interest on total operating capital and the interest on annual operating capital.

Appendix D, Table 3
Estimated Minimum Requirements for \$3,000 Returns to Operator Owned Resources With Specified Land Returns, Eastern Clay Loam Situation, Oklahoma Panhandle

Item	Unit	Land Return (Percent) ¹			
		5.0	3.75	2.5	0.0
Total Land	Acres			2,321	1,301
Cropland	Acres			1,135	636
Wheat	Acres			593	333
Grain Sorghum	Acres			0	86
Forage Sorghum	Acres			37	40
Grazed Out Small Grain	Acres			90	50
Reseeded Cropland	Acres			188	0
Cows	Animals			56	31
Feeders	Animals			87	49
Operator Labor	Hours			1,584	1,158
Hired Labor	Hours			131	0
Investment					
Land and Buildings	Dollars	No Solution	No Solution	151,724	86,165
Machinery	Dollars			6,661	5,240
Total Operating Capital	Dollars			23,616	12,927
Total Capital Requirement ²	Dollars			182,001	104,332
Gross Income	Dollars			28,019	16,365
Operating and Overhead Expense	Dollars			20,699	12,669
Returns to Nonowned Land	Dollars			3,252	0
Machinery Fixed Costs	Dollars			1,068	696
Returns to Operator Owned Resources ³	Dollars			3,275	3,153

¹Percent of the investment in nonowned land.

²In a minimum resource model, variations in land prices at a constant rate of return correspond to variations in land returns at a constant land price. However, total capital requirements would differ. In these solutions, land prices of \$65, \$49, \$33, and 0 and a land return of 5 percent correspond to land returns of 5, 3.75, 2.5, and 0 percent respectively with land at the current price of \$65 per acre.

³Returns to operator labor and management, 320 acres of land, and one 4-plow tractor and machinery complement. Returns exceed \$3,000 because of the adjustment for the difference between the interest on total operating capital and the interest on annual operating capital.

Appendix D, Table 4
Estimated Minimum Requirements for \$5,000 Return to Operator Owned Resources With Specified Land Returns, Eastern Clay Loam Situation, Oklahoma Panhandle

Item	Unit	Land Return (Percent) ¹			
		5.0	3.75	2.5	0.0
Total Land	Acres			4,913	1,827
Cropland	Acres			2,402	893
Wheat	Acres			1,256	467
Grain Sorghum	Acres			0	36
Forage Sorghum	Acres			78	54
Grazed Out Small Grain	Acres			190	71
Reseeded Cropland	Acres			398	87
Cows	Animals			119	46
Feeders	Animals			184	68
Operator Labor	Hours			1,794	1,518
Hired Labor	Hours			1,836	0
Investment					
Land and Buildings	Dollars	No Solution	No Solution	321,163	120,355
Machinery	Dollars			14,100	5,240
Total Operating Capital	Dollars			51,939	18,879
Total Capital Requirement ²	Dollars			387,202	144,474
Gross Income	Dollars			59,306	22,567
Operating and Overhead Expense	Dollars			44,582	16,871
Return to Nonowned Land	Dollars			7,464	0
Machinery Fixed Costs	Dollars			2,260	696
Return to Operator Owned Resources ³	Dollars			5,639	5,214

¹Percent of the investment in nonowned land.

²In a minimum resource model, variations in land prices at a constant rate of return correspond to variations in land returns at a constant land price. However, total capital requirements would differ. In these solutions, land prices of \$65, \$49, \$33 and 0 and a land return of 5 percent correspond to land returns of 5, 3.75, 2.5, and 0 percent respectively with land at the current price of \$65 per acre.

³Returns to operator labor and management, 320 acres of land, and one 4-plow tractor and machinery complement. Returns exceed \$5,000 because of the adjustment for the difference between the interest on total operating capital and the interest on annual operating capital.

Appendix D, Table 5
Estimated Minimum Requirements for \$3,000 Returns to Operator Owned Resources With Specified Land Returns, Cimarron Sandy Situation, Oklahoma Panhandle

Item	Unit	Land Return (Percent) ¹			
		5.0	3.75	2.5	0.0
Total Land	Acres		13,214	2,422	1,272
Cropland	Acres		10,783	1,976	1,038
Wheat	Acres		2,144	515	272
Grain Sorghum	Acres		6,061	971	508
Forage Sorghum	Acres		31	2	1
Grazed Out Small Grain	Acres		390	94	50
Reseeded Cropland	Acres		0	0	0
Cows	Animals		97	13	7
Feeders	Animals		362	87	46
Operator Labor	Hours	No Solution	1,858	1,301	924
Hired Labor	Hours		12,919	1,314	448
Investment					
Land and Buildings	Dollars		812,000	148,832	78,164
Machinery	Dollars		63,163	11,577	6,080
Total Operating Capital	Dollars		98,090	18,023	9,188
Total Capital Requirement ²	Dollars		973,253	178,432	93,432
Gross Income	Dollars		181,028	35,247	18,549
Operating and Overhead Expense	Dollars		138,841	27,229	14,570
Return to Nonowned Land	Dollars		29,012	3,153	0
Machinery Fixed Costs	Dollars		10,175	1,865	979
Return to Operator Owned Resources ³	Dollars		4,666	3,323	3,162

¹Percent of the investment in nonowned land.

²In a minimum resource model, variations in land prices at a constant rate of return correspond to variations in land returns at a constant land price. However, total capital requirements would differ. In these solutions, land prices of \$60, \$45, \$30, and 0 and a land return of 5 percent correspond to land returns of 5, 3.75, 2.5, and 0 percent respectively with land at the current price of \$60 per acre. With a land price of \$45 per acre, and a 5 percent land return, the capital requirement would be \$775,043.

³Returns to operator labor and management, 320 acres of land, and one 4-plow tractor and machinery complement. Returns exceed \$3,000 because of the adjustment for the difference between the interest on total operating capital and the interest on annual operating capital.

Appendix D, Table 6
Estimated Minimum Requirements for \$5,000 Return to Operator Owned Resources With Specified Land Returns, Cimarron Sandy Situation, Oklahoma Panhandle

Item	Unit	Land Return (Percent) ¹			
		5.0	3.75	2.5	0.0
Total Land	Acres		40,269	4,180	2,002
Cropland	Acres		32,860	3,411	1,634
Wheat	Acres		6,533	678	428
Grain Sorghum	Acres		18,472	1,917	799
Forage Sorghum	Acres		95	10	1
Grazed Out Small Grain	Acres		1,188	123	78
Reseeded Cropland	Acres		0	0	0
Cows	Animals		297	31	11
Feeders	Animals		1,103	115	72
Operator Labor	Hours		1,858	1,686	1,164
Hired Labor	Hours		43,176	2,988	995
Investment		No Solution			
Land and Buildings	Dollars		2,474,530	256,861	123,023
Machinery	Dollars		192,486	19,980	9,570
Total Operating Capital	Dollars		303,668	29,662	14,814
Total Capital Requirement ²	Dollars		2,970,684	306,503	147,407
Gross Income	Dollars		551,661	57,276	29,177
Operating and Overhead Expense	Dollars		425,769	43,267	22,636
Return to Nonowned Land	Dollars		89,885	5,790	0
Machinery Fixed Costs	Dollars		31,007	3,219	1,541
Return to Operator Owned Resources ³	Dollars		10,219	5,864	5,265

¹Percent of the investment in nonowned land.

²In a minimum resource model, variations in land prices at a constant rate of return correspond to variations in land returns at a constant land price. However, total capital requirements would differ. In these solutions, land prices of \$60, \$45, \$30, and 0 and a land return of 5 percent correspond to land returns of 5, 3.75, 2.5, and 0 percent respectively with land at the current price of \$60 per acre. With a land price of \$45 per acre, and a 5 percent land return, the capital requirement would be \$2,366,649.

³Returns to operator labor and management, 320 acres of land, and one 4-plow tractor and machinery complement. Returns exceed \$5,000 because of the adjustment for the difference between the interest on total operating capital and the interest on annual operating capital.

Appendix D, Table 7
Estimated Minimum Requirements for \$3,000 Return to Operator Owned Resources With Specified Land Returns, Eastern Sandy Situation, Oklahoma Panhandle

Item	Unit	Land Return (Percent) ¹			
		5.0	3.75	2.5	0.0
Total Land	Acres	1,447	1,127	963	776
Cropland	Acres	815	635	542	437
Wheat	Acres	397	310	265	213
Grain Sorghum	Acres	128	100	85	69
Forage Sorghum	Acres	18	14	12	10
Grazed Out Small Grain	Acres	108	84	72	58
Reseeded Cropland	Acres	0	0	0	0
Cows	Animals	22	17	15	12
Feeders	Animals	108	85	72	58
Operator Labor	Hours	1,306	1,082	923	744
Hired Labor	Hours	81	0	0	0
Investment					
Land and Buildings	Dollars	110,125	86,407	73,344	59,800
Machinery	Dollars	5,240	5,240	5,240	5,240
Total Operating Capital	Dollars	18,240	14,129	12,075	9,730
Total Capital Requirement ²	Dollars	133,605	105,776	90,659	74,770
Gross Income	Dollars	28,775	22,416	19,157	15,435
Operating and Overhead Expense	Dollars	20,853	16,450	14,254	11,739
Return to Nonowned Land	Dollars	4,226	2,270	1,207	0
Machinery Fixed Costs	Dollars	696	696	696	696
Return to Operator Owned Resources ³	Dollars	3,325	3,251	3,214	3,173

¹Percent of the investment in nonowned land.

²In a minimum resource model, variations in land prices at a constant rate of return correspond to variations in land returns at a constant land price. However, total capital requirements would differ. In these solutions, land prices of \$75, \$56, \$38, and 0 and a land return of 5 percent correspond to land returns of 5, 3.75, 2.5, and 0 percent respectively with land at the current price of \$75 per acre. With land prices of \$75 and \$56 per acre, and a 5 percent land return, capital requirements would be \$133,605 and \$84,363 respectively.

³Returns to operator labor and management, 320 acres of land, and one 4-plow tractor and machinery complement. Returns exceed \$3,000 because of the adjustment for the difference between the interest on total operating capital and the interest on annual operating capital.

Appendix D, Table 8
Estimated Minimum Requirements for \$5,000 Return to Operator Owned
Resources With Specified Land Returns, Eastern Sandy Situation,
Oklahoma Panhandle

Item	Unit	Land Return (Percent) ¹			
		5.0	3.75	2.5	0.0
Total Land	Acres	3,274	1,866	1,420	1,086
Cropland	Acres	1,843	1,051	799	611
Wheat	Acres	899	513	390	298
Grain Sorghum	Acres	290	165	126	96
Forage Sorghum	Acres	41	23	18	13
Grazed Out Small Grain	Acres	245	140	106	81
Reseeded Cropland	Acres	0	0	0	0
Cows	Animals	50	28	22	17
Feeders	Animals	245	140	106	81
Operator Labor	Hours	1,747	1,508	1,292	1,042
Hired Labor	Hours	1,394	282	71	0
Investment					
Land and Buildings	Dollars	248,824	142,283	107,390	83,050
Machinery	Dollars	10,804	6,158	5,240	5,240
Total Operating Capital	Dollars	42,784	23,742	18,894	13,610
Total Capital Requirement ²	Dollars	302,412	172,183	131,524	101,900
Gross Income	Dollars	65,111	37,109	28,249	21,593
Operating and Overhead					
Expense	Dollars	47,298	26,772	20,490	15,897
Return to Nonowned Land	Dollars	11,078	4,348	2,063	0
Machinery Fixed Costs	Dollars	1,735	989	696	696
Return to Operator					
Owned Resources ³	Dollars	5,780	5,426	5,319	5,242

¹Percent of the investment in nonowned land.

²In a minimum resource model, variations in land prices at a constant rate of return correspond to variations in land returns at a constant land price. However, total capital requirements would differ. In these solutions, land prices of \$75, \$56, \$38, and 0 and a land return of 5 percent correspond to land returns of 5, 3.75, 2.5, and 0 percent respectively with land at the current price of \$75 per acre. With land prices of \$75 and \$56 per acre, and a 5 percent land return, capital requirements would be \$302,412 and \$136,729 respectively.

³Returns to operator labor and management, 320 acres of land, and one 4-plow tractor and machinery complement. Returns exceed \$5,000 because of the adjustment for the difference between the interest on total operating capital and the interest on annual operating capital.

Appendix E, Table 1
Estimated Minimum Requirements for \$3,000 Return to Operator Labor and Management With Yields Increased by 10 Percent; Specified Land Returns, Panhandle Clay Loam Situation, Oklahoma Panhandle

Item	Unit	Land Return (Percent) ¹	
		5.0	0.0
Total Land	Acres	1,496	575
Cropland	Acres	1,258	484
Wheat	Acres	639	246
Grain Sorghum	Acres	179	71
Forage Sorghum	Acres	46	17
Grazed Out Small Grain	Acres	137	53
Reseeded Cropland	Acres	5	0
Cows	Animals	4	1
Feeders	Animals	145	56
Operator Labor	Hours	1,301	668
Hired Labor	Hours	434	0
Investment			
Land and Buildings	Dollars	151,844	59,100
Machinery	Dollars	7,375	5,240
Total Operating Capital	Dollars	19,931	7,432
Total Capital Requirement ²	Dollars	179,150	71,772
Gross Income	Dollars	39,795	15,314
Operating and Overhead Expense	Dollars	27,879	11,320
Return to Land	Dollars	7,480	0
Machinery Fixed Costs	Dollars	1,436	994
Return to Operator Labor and Management ³	Dollars	3,443	3,164

¹Percent of the investment in land.

²In a minimum resource model, variations in land prices at a constant rate of return correspond to variations in land returns at a constant land price. However, total capital requirements would differ. In these solutions, land prices of \$100 and 0 and a land return of 5.0 percent correspond to land returns of 5.0 and 0.0 percent respectively with land at the current price of \$100 per acre.

³Returns exceed \$3,000 because of the adjustment for the difference between the interest on total operating capital and the interest on annual operating capital.

Appendix E, Table 2
Estimated Minimum Requirements for \$5,000 Return to Operator Labor and Management With Yields Increased by 10 Percent; Specified Land Returns, Panhandle Clay Loam Situation, Oklahoma Panhandle

Item	Unit	Land Return (Percent) ¹	
		5.0	0.0
Total Land	Acres	2,486	788
Cropland	Acres	2,091	663
Wheat	Acres	1,062	337
Grain Sorghum	Acres	298	97
Forage Sorghum	Acres	77	24
Grazed Out Small Grain	Acres	227	72
Reseeded Cropland	Acres	9	0
Cows	Animals	7	2
Feeders	Animals	242	77
Operator Labor	Hours	1,595	917
Hired Labor	Hours	1,289	0
Investment			
Land and Buildings	Dollars	252,329	80,400
Machinery	Dollars	12,256	5,240
Total Operating Capital	Dollars	33,831	10,179
Total Capital Requirement ²	Dollars	298,416	95,819
Gross Income	Dollars	66,134	20,974
Operating and Overhead Expense	Dollars	46,317	14,980
Return to Land	Dollars	12,430	0
Machinery Fixed Costs	Dollars	2,387	994
Return to Operator Labor and Management ³	Dollars	5,757	5,225

¹Percent of the investment in land.

²In a minimum resource model, variations in land prices at a constant rate of return correspond to variations in land returns at a constant land price. However, total capital requirements would differ. In these solutions, land prices of \$100 and 0 and a land return at 5.0 percent correspond to land returns of 5.0 and 0.0 percent respectively with land at the current price of \$100 per acre.

³Returns exceed \$5,000 because of the adjustment for the difference between the interest on total operating capital and the interest on annual operating capital.

Appendix E, Table 3

Estimated Minimum Requirements for \$3,000 Return to Operator Labor and Management With Yields Increased by 10 Percent; Specified Land Returns, Eastern Clay Loam Situation, Oklahoma Panhandle

Item	Unit	Land Return (Percent) ¹	
		5.0	0.0
Total Land	Acres		1,191
Cropland	Acres		582
Wheat	Acres		305
Grain Sorghum	Acres		80
Forage Sorghum	Acres		35
Grazed Out Small Grain	Acres		47
Reseeded Cropland	Acres		0
Cows	Animals		28
Feeders	Animals		50
Operator Labor	Hours	No Solution	1,077
Hired Labor	Hours		0
Investment			
Land and Buildings	Dollars		79,015
Machinery	Dollars		5,240
Total Operating Capital	Dollars		12,351
Total Capital Requirement ²	Dollars		96,606
Gross Income	Dollars		16,311
Operating and Overhead Expense	Dollars		12,317
Return to Land	Dollars		0
Machinery Fixed Costs	Dollars		994
Return to Operator Labor and Management ³	Dollars		3,154

¹Percent of the investment in land.

²In a minimum resource model, variations in land prices at a constant rate of return correspond to variations in land returns at a constant land price. However, total capital requirements would differ. In these solutions, land prices of \$65 and 0 and a land return of 5.0 percent correspond to land returns of 5.0 and 0.0 percent respectively with land at the current price of \$65 per acre.

³Returns exceed \$3,000 because of the adjustment for the difference between the interest on total operating capital and the interest on annual operating capital.

Appendix E, Table 4
Estimated Minimum Requirements for \$5,000 Return to Operator Labor and Management With Yields Increased by 10 Percent; Specified Land Returns, Eastern Clay Loam Situation, Oklahoma Panhandle

Item	Unit	Land Return (Percent) ¹	
		5.0	0.0
Total Land	Acres		1,652
Cropland	Acres		808
Wheat	Acres		422
Grain Sorghum	Acres		57
Forage Sorghum	Acres		52
Grazed Out Small Grain	Acres		65
Reseeded Cropland	Acres		50
Cows	Animals		42
Feeders	Animals		69
Operator Labor	Hours	No Solution	1,454
Hired Labor	Hours		0
Investment			
Land and Buildings	Dollars		108,980
Machinery	Dollars		5,240
Total Operating Capital	Dollars		17,770
Total Capital Requirement ²	Dollars		131,990
Gross Income	Dollars		22,385
Operating and Overhead Expense	Dollars		16,391
Return to Land	Dollars		0
Machinery Fixed Costs	Dollars	994	
Return to Operator Labor and Management ³	Dollars	5,214	

¹Percent of the investment in land.

²In a minimum resource model, variations in land prices at a constant rate of return corresponds to variations in land returns at a constant land price. However, total capital requirements would differ. In these solutions, land prices of \$65 and 0 and a land return at 5.0 percent correspond to land returns of 5.0 and 0.0 percent respectively with land at the current price of \$65 per acre.

³Returns exceed \$5,000 because of the adjustment for the difference between the interest on total operating capital and the interest on annual operating capital.

Appendix E, Table 5
Estimated Minimum Requirements for \$3,000 Return to Operator Labor and Management With Yields Increased by 10 Percent; Specified Land Returns, Cimarron Sandy Situation, Oklahoma Panhandle

Item	Unit	Land Return (Percent) ¹	
		5.0	0.0
Total Land	Acres	13,274	1,005
Cropland	Acres	10,832	820
Wheat	Acres	357	169
Grain Sorghum	Acres	8,216	454
Forage Sorghum	Acres	28	2
Grazed Out Small Grain	Acres	65	31
Reseeded Cropland	Acres	0	0
Cows	Animals	112	7
Feeders	Animals	66	31
Operator Labor	Hours	1,858	832
Hired Labor	Hours	13,369	298
Investment			
Land and Buildings	Dollars	815,687	61,900
Machinery	Dollars	63,450	5,240
Total Operating Capital	Dollars	69,296	6,996
Total Capital Requirement ²	Dollars	948,433	74,136
Gross Income	Dollars	161,456	15,197
Operating and Overhead Expense	Dollars	106,156	11,203
Return to Land	Dollars	39,822	0
Machinery Fixed Costs	Dollars	12,478	994
Return to Operator Labor and Management ³	Dollars	3,858	3,112

¹Percent of the investment in land.

²In a minimum resource model, variations in land prices at a constant rate of return correspond to variations in land returns at a constant land price. However, total capital requirements would differ. In these solutions, land prices of \$60 and 0 and a land return of 5.0 percent correspond to land returns of 5.0 and 0.0 percent respectively with land at the current price of \$60 per acre.

³Returns exceed \$3,000 because of the adjustment for the difference between the interest on total operating capital and the interest on annual operating capital.

Appendix E, Table 6
Estimated Minimum Requirements for \$5,000 Return to Operator Labor
and Management With Yields Increased by 10 Percent; Specified Land
Returns, Cimarron Sandy Situation, Oklahoma Panhandle

Item	Unit	Land Return (Percent) ¹	
		5.0	0.0
Total Land	Acres	28,264	1,551
Cropland	Acres	23,063	1,266
Wheat	Acres	161	261
Grain Sorghum	Acres	18,202	701
Forage Sorghum	Acres	58	3
Grazed Out Small Grain	Acres	29	47
Reseeded Cropland	Acres	0	0
Cows	Animals	243	11
Feeders	Animals	30	49
Operator Labor	Hours	1,858	1,010
Hired Labor	Hours	30,660	735
Investment			
Land and Buildings	Dollars	1,736,823	95,309
Machinery	Dollars	135,102	7,414
Total Operating Capital	Dollars	139,175	11,142
Total Capital Requirement ²	Dollars	2,011,100	113,865
Gross Income	Dollars	331,276	23,458
Operating and Overhead Expense	Dollars	214,916	17,000
Return to Land	Dollars	84,792	0
Machinery Fixed Costs	Dollars	26,568	1,458
Return to Operator Labor and Management ³	Dollars	6,597	6,183

¹Percent of the investment in land.

²In a minimum resource model, variations in land prices at a constant rate of return correspond to variations in land returns at a constant land price. However, total capital requirements would differ. In these solutions, land prices of \$60 and 0 and a land return of 5.0 percent correspond to land returns of 5.0 and 0.0 percent respectively with land at the current price of \$60 per a.c.

³Returns exceed \$5,000 because of the adjustment for the difference between the interest on total operating capital and the interest on annual operating capital.

Appendix E, Table 7
Estimated Minimum Requirements for \$3,000 Return to Operator Labor and Management With Yields Increased by 10 Percent; Specified Land Returns, Eastern Sandy Situation, Oklahoma Panhandle

Item	Unit	Land Return (Percent) ¹	
		5.0	0.0
Total Land	Acres	1,505	719
Cropland	Acres	847	405
Wheat	Acres	413	198
Grain Sorghum	Acres	133	59
Forage Sorghum	Acres	18	14
Grazed Out Small Grain	Acres	113	54
Reseeded Cropland	Acres	0	0
Cows	Animals	23	13
Feeders	Animals	124	59
Operator Labor	Hours	1,363	746
Hired Labor	Hours	116	0
Investment			
Land and Buildings	Dollars	114,475	55,525
Machinery	Dollars	5,240	5,240
Total Operating Capital	Dollars	20,167	9,961
Total Capital Requirement ²	Dollars	139,882	70,726
Gross Income	Dollars	32,673	15,696
Operating and Overhead Expense	Dollars	23,035	11,702
Return to Land	Dollars	5,644	0
Machinery Fixed Costs	Dollars	994	994
Return to Operator Labor and Management ³	Dollars	3,371	3,176

¹Percent of the investment in land.

²In a minimum resource model, variations in land prices at a constant rate of return correspond to variations in land returns at a constant land price. However, total capital requirements would differ. In these solutions, land prices of \$75 and 0 and a land return of 5.0 percent correspond to land returns of 5.0 and 0.0 percent respectively with land at the current price of \$75 per acre.

³Returns exceed \$3,000 because of the adjustment for the difference between the interest on total operating capital and the interest on annual operating capital.

Appendix E, Table 8
Estimated Minimum Requirements for \$5,000 Return to Operator Labor and Management With Yields Increased by 10 Percent; Specified Land Returns, Eastern Sandy Situation, Oklahoma Panhandle

Item	Unit	Land Return (Percent) ¹	
		5.0	0.0
Total Land	Acres	2,490	990
Cropland	Acres	1,402	557
Wheat	Acres	684	272
Grain Sorghum	Acres	220	81
Forage Sorghum	Acres	31	19
Grazed Out Small Grain	Acres	187	74
Reseeded Cropland	Acres	0	0
Cows	Animals	37	17
Feeders	Animals	205	82
Operator Labor	Hours	1,683	1,028
Hired Labor	Hours	764	0
Investment			
Land and Buildings	Dollars	189,240	75,850
Machinery	Dollars	8,217	5,240
Total Operating Capital	Dollars	34,073	13,711
Total Capital Requirement ²	Dollars	231,530	94,801
Gross Income	Dollars	54,045	21,607
Operating and Overhead Expense	Dollars	38,088	15,613
Return to Land	Dollars	9,338	0
Machinery Fixed Costs	Dollars	1,619	994
Return to Operator Labor and Management ³	Dollars	5,635	5,242

¹Percent of the investment in land.

²In a minimum resource model, variations in land prices at a constant rate of return correspond to variations in land returns at a constant land price. However, total capital requirements would differ. In these solutions, land prices of \$75 and 0 and a land return of 5.0 percent correspond to land returns of 5.0 and 0.0 percent respectively with land at the current price of \$75 per acre.

³Returns exceed \$5,000 because of the adjustment for the difference between the interest on total operating capital and the interest on annual operating capital.

Appendix F, Table 1

Estimated Minimum Requirements for \$3,000 Return to Operator Labor and Management, No Price Supports or Acreage Allotments; Specified Land Returns, Panhandle Clay Loam Situation, Oklahoma Panhandle

Item	Unit	Land Return (Percent) ¹	
		5.0	0.0
Total Land	Acres		909
Cropland	Acres		764
Wheat	Acres		485
Grain Sorghum	Acres		0
Forage Sorghum	Acres		30
Grazed Out Small Grain	Acres		97
Reseeded Cropland	Acres		0
Cows	Animals		2
Feeders	Animals		94
Operator Labor	Hours	No Solution	1,014
Hired Labor	Hours		0
Investment			
Land and Buildings	Dollars		92,500
Machinery	Dollars		5,240
Total Operating Capital	Dollars		12,203
Total Capital Requirement ²	Dollars		109,943
Gross Income	Dollars		21,676
Operating and Overhead Expense	Dollars		17,682
Return to Land	Dollars		0
Machinery Fixed Costs	Dollars		994
Return to Operator Labor and Management ³	Dollars		3,274

¹Percent of the investment in land.

²In a minimum resource model, variations in land prices at a constant rate of return correspond to variations in land returns at a constant land price. However, total capital requirements would differ. In these solutions, land prices of \$100 and 0 and a land return of 5.0 percent correspond to land returns of 5.0 and 0.0 percent respectively with land at the current price of \$100 per acre.

³Returns exceed \$3,000 because of the adjustment for the difference between the interest on total operating capital and the interest on annual operating capital.

Appendix F, Table 2
Estimated Minimum Requirements for \$5,000 Return to Operator Labor and Management, No Price Supports or Acreage Allotments; Specified Land Returns, Panhandle Clay Loam Situation, Oklahoma Panhandle

Item	Unit	Land Return (Percent) ¹	
		5.0	0.0
Total Land	Acres		1,083
Cropland	Acres		911
Wheat	Acres		577
Grain Sorghum	Acres		0
Forage Sorghum	Acres		36
Grazed Out Small Grain	Acres		116
Reseeded Cropland	Acres		0
Cows	Animals		2
Feeders	Animals		112
Operator Labor	Hours	No Solution	1,164
Hired Labor	Hours		44
Investment			
Land and Buildings	Dollars		109,925
Machinery	Dollars		5,339
Total Operating Capital	Dollars		14,596
Total Capital Requirement ²	Dollars		129,860
Gross Income	Dollars		25,828
Operating and Overhead Expense	Dollars		19,788
Return to Land	Dollars		0
Machinery Fixed Costs	Dollars		1,040
Return to Operator Labor and Management ³	Dollars		5,328

¹Percent of the investment in land.

²In a minimum resource model, variations in land prices at a constant rate of return correspond to variations in land returns at a constant land price. However, total capital requirements would differ. In these solutions, land prices of \$100 and 0 and a land return of 5.0 percent correspond to land returns of 5.0 and 0.0 percent respectively with land at the current price of \$100 per acre.

³Returns exceed \$5,000 because of the adjustment for the difference between the interest on total operating capital and the interest on annual operating capital.

Appendix F, Table 3

Estimated Minimum Requirements for \$3,000 Return to Operator Labor and Management, No Price Supports or Acreage Allotments; Specified Land Returns, Eastern Clay Loam Situation, Oklahoma Panhandle

Item	Unit	Land Return (Percent) ¹	
		5.0	0.0
Total Land	Acres		1,799
Cropland	Acres		880
Wheat	Acres		591
Grain Sorghum	Acres		0
Forage Sorghum	Acres		27
Grazed Out Small Grain	Acres		85
Reseeded Cropland	Acres		0
Cows	Animals		35
Feeders	Animals		82
Operator Labor	Hours		1,396
Hired Labor	Hours		-46
Investment		No Solution	
Land and Buildings	Dollars		118,535
Machinery	Dollars		5,240
Total Operating Capital	Dollars		18,131
Total Capital Requirement ²	Dollars		141,906
Gross Income	Dollars		22,569
Operating and Overhead Expense	Dollars		18,575
Return to Land	Dollars		0
Machinery Fixed Costs	Dollars		994
Return to Operator Labor and Management ³	Dollars		3,252

¹Percent of the investment in land.

²In a minimum resource model, variations in land prices at a constant rate of return correspond to variations in land returns at a constant land price. However, total capital requirements would differ. In these solutions, land prices of \$65 and 0 and a land return of 5.0 percent correspond to land returns of 5.0 and 0.0 percent respectively with land at the current price of \$65 per acre.

³Returns exceed \$3,000 because of the adjustment for the difference between the interest on total operating capital and the interest on annual operating capital.

Appendix F, Table 4
Estimated Minimum Requirements for \$5,000 Return to Operator Labor and Management, No Price Supports or Acreage Allotments; Specified Land Returns, Eastern Clay Loam Situation, Oklahoma Panhandle

Item	Unit	Land Return (Percent) ¹	
		5.0	0.0
Total Land	Acres		3,114
Cropland	Acres		1,753
Wheat	Acres		1,024
Grain Sorghum	Acres		0
Forage Sorghum	Acres		47
Grazed Out Small Grain	Acres		147
Reseeded Cropland	Acres		0
Cows	Animals		61
Feeders	Animals		142
Operator Labor	Hours	No Solution	1,655
Hired Labor	Hours		842
Investment			
Land and Buildings	Dollars		205,119
Machinery	Dollars		8,937
Total Operating Capital	Dollars		32,338
Total Capital Requirement ²	Dollars		246,394
Gross Income	Dollars		39,067
Operating and Overhead Expense	Dollars		32,223
Return to Land	Dollars		0
Machinery Fixed Costs	Dollars		1,744
Return to Operator Labor and Management ³	Dollars		5,465

¹Percent of the investment in land.

²In a minimum resource model, variations in land prices at a constant rate of return correspond to variations in land returns at a constant land price. However, total capital requirements would differ. In these solutions, land prices of \$65 and 0 and a land return of 5.0 percent correspond to land returns of 5.0 and 0.0 percent respectively with land at the current price of \$65 per acre.

³Returns exceed \$5,000 because of the adjustment for the difference between the interest on total operating capital and the interest on annual operating capital.

Appendix F, Table 5
Estimated Minimum Requirements for \$3,000 Return to Operator Labor and Management, No Price Supports or Acreage Allotments; Specified Land Returns, Cimarron Sandy Situation, Oklahoma Panhandle

Item	Unit	Land Return (Percent) ¹	
		5.0	0.0
Total Land	Acres		1,170
Cropland	Acres		955
Wheat	Acres		0
Grain Sorghum	Acres		761
Forage Sorghum	Acres		3
Grazed Out Small Grain	Acres		0
Reseeded Cropland	Acres		0
Cows	Animals		9
Feeders	Animals		25
Operator Labor	Hours		814
Hired Labor	Hours		626
Investment		No Solution	
Land and Buildings	Dollars		71,897
Machinery	Dollars		5,593
Total Operating Capital	Dollars		7,451
Total Capital Requirement ²	Dollars		84,941
Gross Income	Dollars		16,211
Operating and Overhead Expense	Dollars		12,111
Return to Land	Dollars		0
Machinery Fixed Costs	Dollars		1,100
Return to Operator Labor and Management ³	Dollars		3,149

¹Percent of the investment in land.

²In a minimum resource model, variations in land prices at a constant rate of return correspond to variations in land returns at a constant land price. However, total capital requirements would differ. In these solutions, land prices of \$60 and 0 and a land return at 5.0 percent correspond to land returns of 5.0 and 0.0 percent respectively with land at the current price of \$60 per acre.

³Returns exceed \$3,000 because of the adjustment for the difference between the interest on total operating capital and the interest on annual operating capital.

Appendix F, Table 6
Estimated Minimum Requirements for \$5,000 Return to Operator Labor and Management, No Price Supports or Acreage Allotments; Specified Land Returns, Cimarron Sandy Situation, Oklahoma Panhandle

Item	Unit	Land Return (Percent) ¹	
		5.0	0.0
Total Land	Acres		1,842
Cropland	Acres		1,503
Wheat	Acres		0
Grain Sorghum	Acres		1,198
Forage Sorghum	Acres		4
Grazed Out Small Grain	Acres		0
Reseeded Cropland	Acres		0
Cows	Animals		14
Feeders	Animals		39
Operator Labor	Hours	No Solution	991
Hired Labor	Hours		1,276
Investment			
Land and Buildings	Dollars		113,191
Machinery	Dollars		8,805
Total Operating Capital	Dollars		12,081
Total Capital Requirement ²	Dollars		134,077
Gross Income	Dollars		25,499
Operating and Overhead Expense	Dollars		18,768
Return to Land	Dollars		0
Machinery Fixed Costs	Dollars		1,731
Return to Operator Labor and Management ³	Dollars		5,244

¹Percent of the investment in land.

²In a minimum resource model variations in land prices at a constant rate of return correspond to variations in land returns at a constant land price. However, total capital requirements would differ. In these solutions, land prices of \$60 and 0 and a land return of 5.0 percent correspond to land returns of 5.0 and 0.0 percent respectively with land at the current price of \$60 per acre.

³Returns exceed \$5,000 because of the adjustment for the difference between the interest on total operating capital and the interest on annual operating capital.

Appendix F, Table 7

Estimated Minimum Requirements for \$3,000 Return to Operator Labor and Management, No Price Supports or Acreage Allotments; Specified Land Returns, Eastern Sandy Situation, Oklahoma Panhandle

Item	Unit	Land Return (Percent) ¹	
		5.0	0.0
Total Land	Acres	9,900	902
Cropland	Acres	5,574	508
Wheat	Acres	0	0
Grain Sorghum	Acres	4,412	402
Forage Sorghum	Acres	47	4
Grazed Out Small Grain	Acres	0	0
Reseeded Cropland	Acres	0	0
Cows	Animals	226	20
Feeders	Animals	0	15
Operator Labor	Hours	1,732	858
Hired Labor	Hours	8,317	112
Investment			
Land and Buildings	Dollars	752,400	69,250
Machinery	Dollars	32,670	5,240
Total Operating Capital	Dollars	68,264	6,956
Total Capital Requirement ²	Dollars	853,334	81,446
Gross Income	Dollars	108,474	11,726
Operating and Overhead Expense	Dollars	61,914	7,732
Return to Land	Dollars	37,125	0
Machinery Fixed Costs	Dollars	6,435	994
Return to Operator Labor and Management ³	Dollars	3,442	3,081

¹Percent of the investment in land.

²In a minimum resource model, variations in land prices at a constant rate of return correspond to variations in land returns at a constant land price. However, total capital requirements would differ. In these solutions, land prices of \$75 and 0 and a land return of 5.0 percent correspond to land returns of 5.0 and 0.0 percent respectively with land at the current price of \$75 per acre.

³Returns exceed \$3,000 because of the adjustment for the difference between the interest on total operating capital and the interest on annual operating capital.

Appendix F, Table 8
Estimated Minimum Requirements for \$5,000 Return to Operator Labor and Management, No Price Supports or Acreage Allotments; Specified Land Returns, Eastern Sandy Situation, Oklahoma Panhandle

Item	Unit	Land Return (Percent) ¹	
		5.0	0.0
Total Land	Acres	19,636	1,291
Cropland	Acres	11,055	727
Wheat	Acres	0	0
Grain Sorghum	Acres	8,750	575
Forage Sorghum	Acres	94	6
Grazed Out Small Grain	Acres	0	0
Reseeded Cropland	Acres	0	0
Cows	Animals	448	28
Feeders	Animals	0	21
Operator Labor	Hours	1,858	1,010
Hired Labor	Hours	18,072	378
Investment			
Land and Buildings	Dollars	1,492,336	98,425
Machinery	Dollars	64,799	5,240
Total Operating Capital	Dollars	137,359	10,224
Total Capital Requirement ²	Dollars	1,694,494	113,889
Gross Income	Dollars	215,135	16,776
Operating and Overhead Expense	Dollars	123,737	12,782
Return to Land	Dollars	73,635	0
Machinery Fixed Costs	Dollars	12,763	994
Return to Operator Labor and Management ³	Dollars	5,935	5,124

¹Percent of the investment in land.

²In a minimum resource model, variations in land prices at a constant rate of return correspond to variations in land returns at a constant land price. However, total capital requirements would differ. In these solutions, land prices of \$75 and 0 and a land return of 5.0 percent correspond to land returns of 5.0 and 0.0 percent respectively with land at the current price of \$75 per acre.

³Returns exceed \$5,000 because of the adjustment for the difference between the interest on total operating capital and the interest on annual operating capital.